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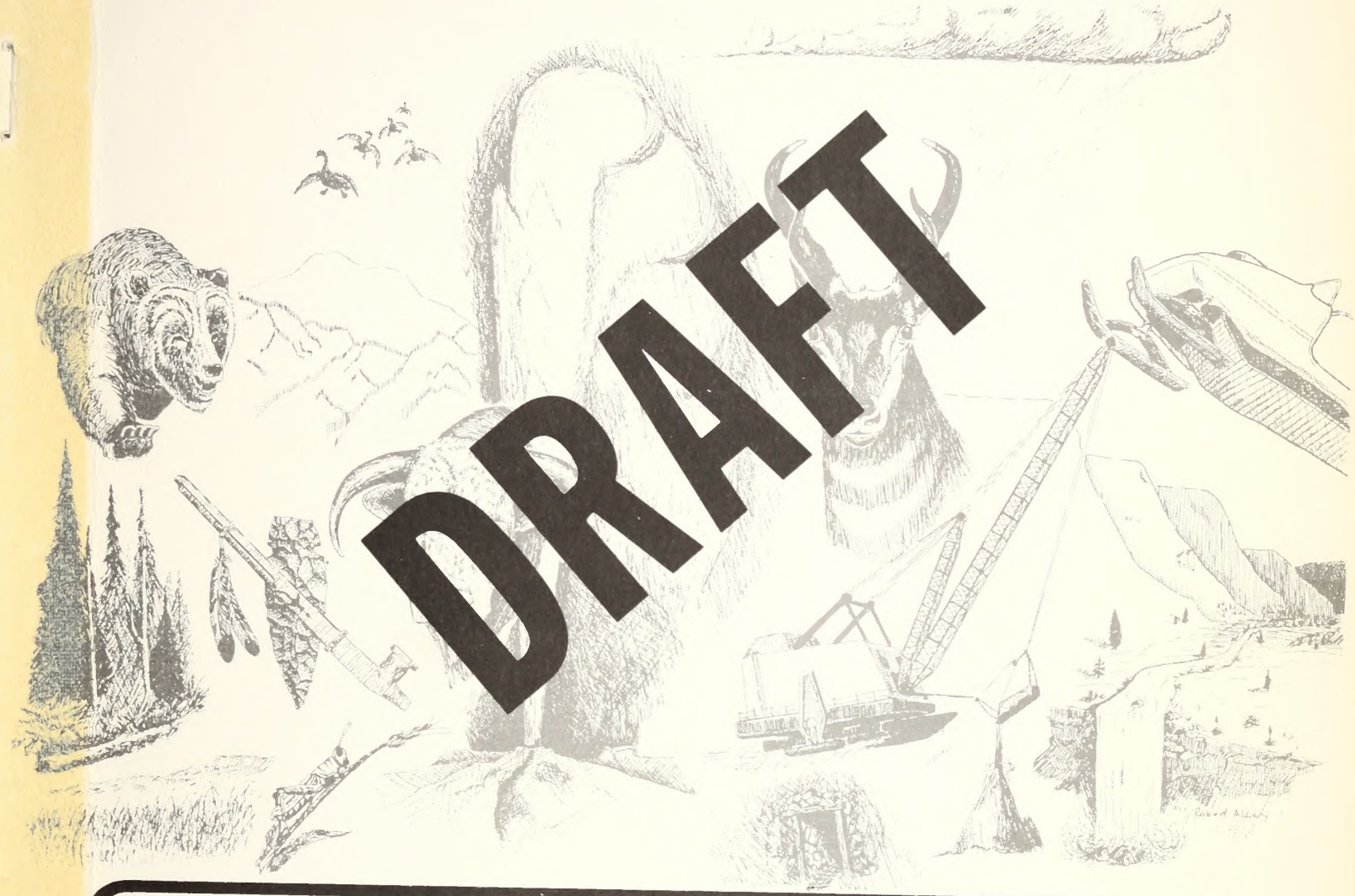

WEST DECKER
Coal Lease Application

Decker, Montana
Miles City District Office

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LAND USE ANALYSIS

Decker Coal Company
Lease Application M-37604

West Decker Mine

August 1979

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Introduction

INTRODUCTION

Under the Department of the Interior's new Federal Coal Management Program, federal coal reserves will become available for general leasing in 1982. It is understood, however, that there is a need to provide federal coal to maintain existing operations, to allow companies to meet contractual commitments, and to avoid bypass of federal coal. In order to provide for these emergency needs, provisions have been made to allow leasing in these instances. Standards have been established by the Department of the Interior in their new Coal Management Program to regulate emergency leasing until 1982.

The Decker Coal Company has applied for a lease on federal coal lying outside of an approved Management Framework Plan Update area. The 1979 planning update was to determine the unsuitability of certain lands for coal development. The remaining lands in the update area were acceptable for further consideration for coal development. The Bureau of Land Management has completed a Land Use Analysis (LUA) on the application area to determine its potential for coal leasing and development.

The proposed lease area lies within the existing Decker-Birney Planning Unit. The 1975 MFP for this unit recommends the leasing of strippable coal reserves.

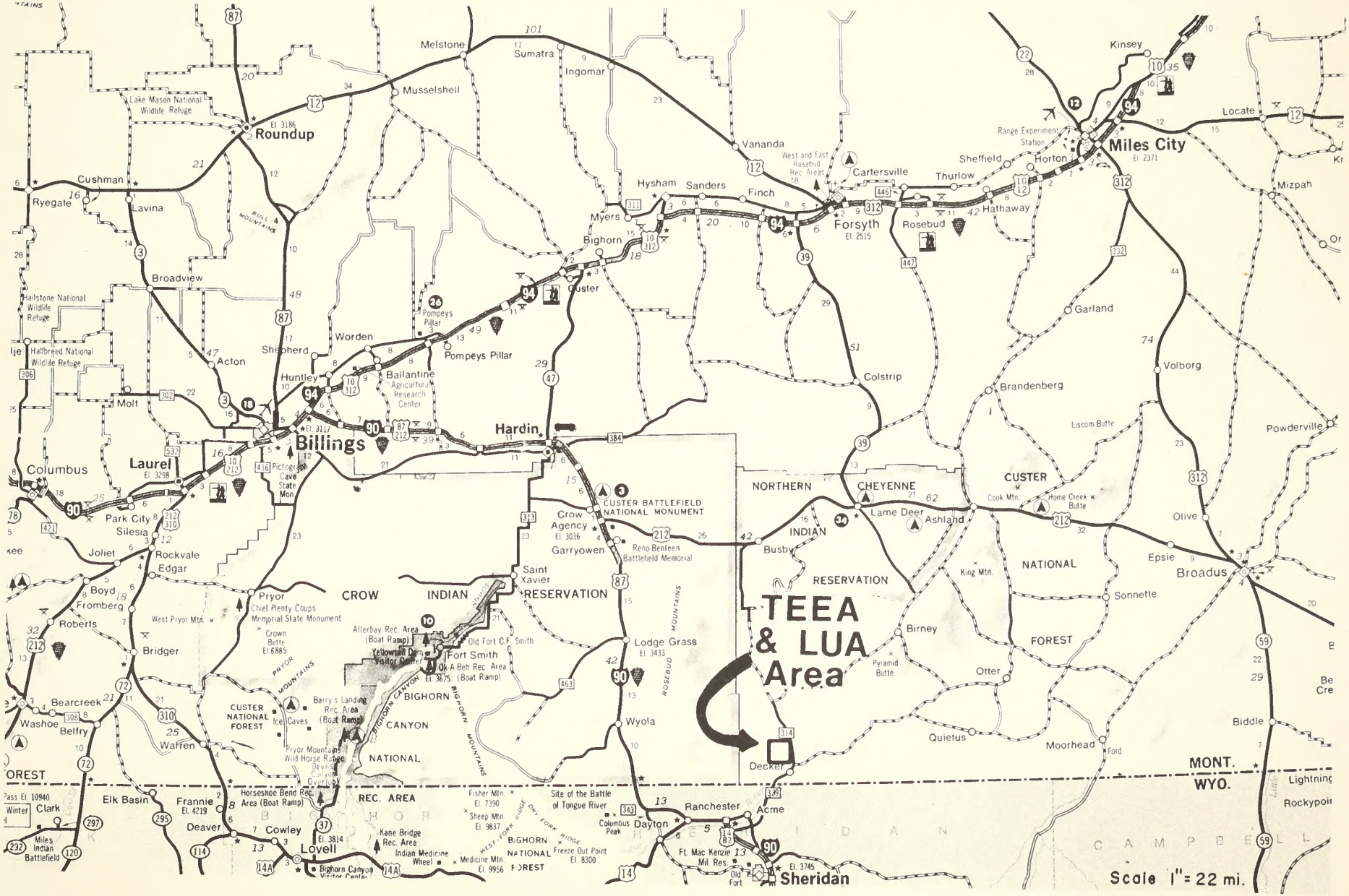
The lease application area was omitted from the original MFP lease recommendation area based on excessive overburden making the stripping

ratio too expensive for mining (see Map L-1). Excessive overburden as outlined in the 1974 criteria was anything over 150 feet deep. Based on new techniques, high coal prices and by averaging overburden depth, the companies are now able to mine deeper coal deposits on an economical basis.

Should Decker Coal Company acquire the lease, a possible bypass of federal coal would be prevented in the application area. Since the majority of the federal coal (400 acres) is under private surface, the LUA is used to determine impacts on the surface and resources from the leasing of federal coal.

The major analytical document used in the preparation of the Land Use Analysis is the Technical Examination/Environmental Analysis (TE/EA). A "Technical Examination" is the analysis made on mineral disposal actions. The "Environmental Assessment" is the analysis of impacts of a proposed federal action on the physical, social and economic environment. The two analyses are so similar in content that they were merged and recorded in one document.

MAP 1-1
LOCATION MAP



APPLICATION OF UNSUITABILITY CRITERIA ON THE WEST DECKER APPLICATION AREA

All 19 unsuitability criteria were addressed when doing the land use analysis on the West Decker application area. The application area did not have any conditions or situations that fitted the unsuitability criteria.

See the list of unsuitability criteria in Appendix A of this section for the definition of each of the above mentioned criteria.

A discussion of the application of each unsuitability criterion follows:

Criterion 1. Federal Land Systems

There are no federal land systems within the application area. Therefore, no area was excluded under this criterion.

Criterion 2. Rights-of-Way and Easements

There are no federal lands within the application area with rights-of-way or easements. Therefore, no area was excluded under this criterion.

Criterion 3. Buffer Zones Along Rights-of-Way and Adjacent to Communities and Buildings

There are no roads and dwellings within the application area. Therefore, no area was excluded under this criterion.

Criterion 4. Wilderness Study Areas

There are no federal lands designated as wilderness or federal lands under review, and no federal lands have wilderness characteristics. Therefore, no areas have been excluded under this criterion.

Criterion 5. Scenic Areas

There are no scenic areas within the application area. Therefore, no areas have been excluded under this criterion.

Criterion 6. Lands Used for Scientific Studies

There are no lands used for scientific studies within the application area. Therefore, no areas were excluded under this criterion.

Criterion 7. Historic Lands and Sites

There are no sites which can be considered unsuitable for leasing based on this criterion.

Criterion 8. Natural Areas

There are no areas or sites on or presently eligible for inclusion on the National Register of Natural Landmarks in the application area. Therefore, no areas were excluded under this criterion.

Criterion 9. Federal Listed Endangered Species

Bald eagles frequent the Tongue River and Tongue River Reservoir on a migratory basis, but no breeding or concentrated use has been identified in and around the application area. Whooping cranes may migrate through the area, but no sightings have been documented. Since there are no areas of legally designated critical habitat for Federal threatened/endangered (T/E) plant and/or animal species or habitat determined to be of essential value where T/E species have been scientifically documented, no areas were excluded under this criterion.

Criterion 10. State Listed Endangered Species

There are no known habitats of State listed endangered plant or

animal species to be adversely affected in the application area. No part of the application area was excluded under this criterion.

Criterion 11. Bald and Golden Eagle Nests

There are no known bald or golden eagle nest sites located within the application area, but one active nest site and one alternate nest site have been identified west of the area. The alternate nest site is one mile from the application area boundary and the active nest is approximately two miles away. Some hunting use has been observed along the ridgelines in the application area, but the percentage of the application area within the eagle's hunting territory is not known. Since the active nest site is two miles away in a relatively secure area and the ridgelines along Squirrel Creek do provide a hunting territory, no area was declared unsuitable under this criterion.

Criterion 12. Bald and Golden Eagle Roost and Concentration Areas

Both bald and golden eagles do occur in the Decker area, but the only known roost and concentration areas are along the Tongue River below the reservoir dam northeast of the Decker area. No exclusions were made under this criterion.

Criterion 13. Falcon Cliff Nesting Sites

One active prairie falcon nest site has been identified, but it is

more than a mile distant from the application area. The hunting territory for this pair has not been identified. No area was declared unsuitable because of the distance from the application area and the availability of prey species habitat in the Squirrel Creek drainage.

Criteria 14. Migratory Birds

The following list of migratory bird species of high Federal interest has been identified on or near the application area. A majority of the use by these birds is on a summer seasonal basis and no nesting/feeding/cover areas have been identified. Since Federal lands of high priority habitat have not been identified for these species, no exclusions were made for this unsuitability criterion.

Western grebe
Double-crested cormorant (rookery on the Tongue River Reservoir)
White pelican
Common merganser
Goshawk
Swainson's hawk
Marsh hawk
Ferruginous hawk
Merlin
Prairie falcon
Osprey (nest identified on Tongue River Reservoir)
Long-billed curlew
Upland sandpiper
Short-eared owl
Long-eared owl
Red-headed woodpecker
Mountain bluebird
Loggerhead shrike
Baird's sparrow
Clay-colored sparrow
Brewer's sparrow

Criterion 15. State Resident Fish and Wildlife

Portions of two crucial mule deer winter ranges, 117 acres, have been identified on the lease application area. These areas are the easternmost extension of the winter ranges with the highest use occurring in the north where suitable southwest-facing slopes exist (see map No. L-2). Since the acreage involved is small and the majority of winter use is occurring to the west along the Squirrel Creek and Pond Creek divides outside the application area, no land was determined to be unsuitable for mining.

Antelope are present yearlong in the Decker area, but no major use occurs on the application area. A tentative winter migration route between Spring Creek and Squirrel Creek through sections 9, 17 and 20 has been identified (see map No. L-2). Since this migration has been observed for one year only, no area was declared unsuitable.

Several other species of high interest to the State of Montana have been identified on or near the consideration area. No areas were excluded for these species as no Federal lands have been identified as essential for maintenance of these priority species.

Goshawk
Osprey
Swainson's hawk
Ferruginous hawk
Merlin
Prairie falcon
Upland sandpiper

Longbilled curlew
Long-eared owl
Eastern bluebird
Mountain bluebird
Clay-colored sparrow
Brewer's sparrow
Long-legged bat
Big-earred bat
Plains hognose snake

Criterion 16. Floodplains

There are no floodplains that can be considered unsuitable for leasing based on this criterion.

Criterion 17. Municipal Watersheds

There are no municipal watersheds located in the application area. Therefore, no areas were excluded under this criterion.

Criterion 18. National Resource Waters

There are no national resource waters located on or within 1/4 miles of the bypass areas. Therefore, no areas were excluded under this criterion.

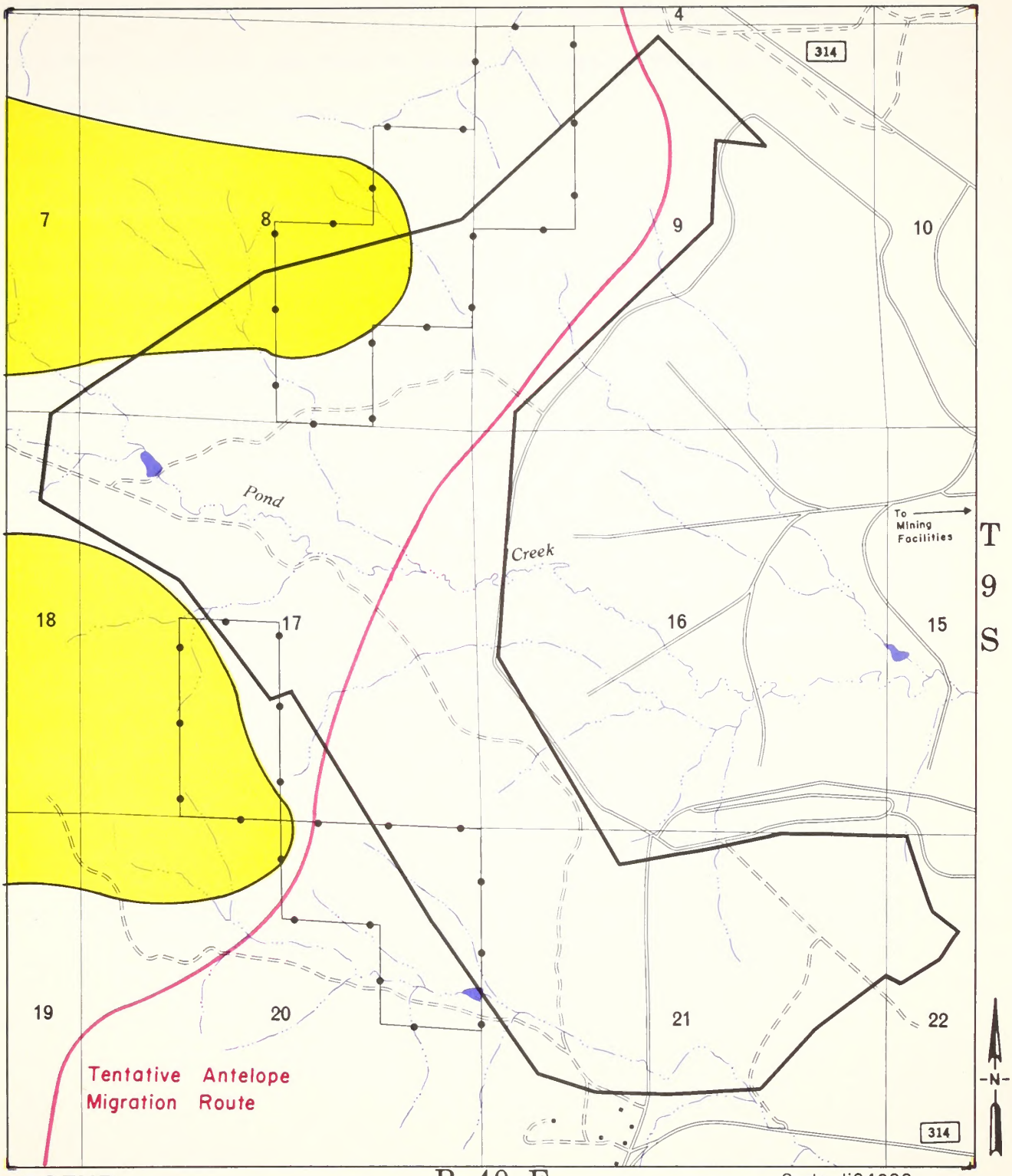
Criterion 19. Alluvial Valley Floors

There are no alluvial valley floors within the application area. Therefore, no areas were excluded under this criterion.

Criterion 20. State Proposed Criteria

There are no federal lands to which an applicable state criteria apply in the application area, therefore no lands were excluded under this criterion.

MAP L-2
WILDLIFE



LEGEND

Mine Limits

Lease Application M37604

Mule Deer Winter Range

RESOURCE TRADE-OFFS

The purpose of this section of the land use analysis is to present recommendations that may exclude areas from mining where it has been determined that the values of other resources exceed the value of the coal.

A comprehensive land use plan was completed in the Decker-Birney Planning Unit in 1974. At this time coal lease consideration areas were identified after multiple use conflicts were analyzed and resolved.

Portions of the West Decker application area are located outside of this original lease consideration area. Overburden depth, not resource values, was the limiting factor that prevented the inclusion of the application area for coal lease consideration. Therefore, resource values will not exclude areas from mining.

SURFACE OWNER VIEWS

In compliance with Section 714(d) of the Surface Mining Control and Reclamation Act (SMCRA), owners of private surface overlying federal coal must be consulted regarding their views on leasing federal coal. Surface ownership was determined by county courthouse record searches conducted by Miles City District realty personnel. The record searches indicated all surface, except forty acres of public domain, are owned by the Decker Coal Company and Consolidation Coal Company. Since no "qualified landowners", by definition, own surface rights in the application area, Section 714(d) of SMCRA did not apply.

RELATIONSHIP TO STATE AND LOCAL PLANNING

The State doesn't have a comprehensive land use plan. However, Big Horn County has a comprehensive plan that was completed in 1974. This plan does not directly relate to the leasing of federal coal in the Decker Mine area, although it recognized a need for expansion of the mine and expects that it will occur.

The BLM's proposal to lease coal within the Decker Mine area is compatible with the Big Horn County plan.

PROPOSED SPECIAL STIPULATIONS

The purpose of this section of the land use analysis is to present the recommended special stipulations that are to be made a part of the coal lease issued in response to the short-term bypass application. Special stipulations are those developed and placed in a standard lease form that direct the lessee to conduct certain operations not already prescribed by law, regulation, or standard lease terms. They are also used to clarify or make more specific already prescribed requirements.

The intent of the special stipulations recommended for this lease is to mandate to the lessee what is required as a product of mining and reclamation rather than mandate how to achieve it. This provides flexibility and allows application of practices that best fit the lessee's operation and specific situations. Procedures must be spelled out in an Operation and Reclamation Plan which must be approved by the Montana Department of State Lands, Office of Surface Mining, Bureau of Land Management, and U.S. Geological Survey. Many of the mitigating measures in the TE/EAR are not reflected here as proposed stipulations because they are elsewhere covered by law or regulation or are procedural rather than product oriented.

Following are the special lease stipulations recommended for this bypass lease application:

1. Reclamation shall result in the lands disturbed in the mining process being revegetated to provide a diverse shrub-grassland

cover to replace lost winter range habitat unless otherwise excepted by the Montana Department of State Lands and the Office of Surface Mining.

Appendix A
Unsuitability Criteria

APPENDIX A
UNSUITABILITY CRITERIA

Final Unsuitability Criteria Selected by the Secretary of the Interior on June 1, 1979

CRITERION 1 - FEDERAL LAND SYSTEMS

All federal lands included in the following land systems or categories shall be considered unsuitable for coal mining: National Park System, National Wildlife Refuge System, National Systems of Trails, National Wilderness Preservation System, National Wild and Scenic Rivers System, National Recreation Areas and other federally purchased recreation lands, Custer National Forest, and federal lands in incorporated cities, towns, and villages.

All federal lands which are recommended for inclusion in such systems or categories by the Administration in legislative proposals submitted to the Congress or which are required by statute to be studied for inclusion in such systems or categories shall be considered unsuitable. A lease may, however, be issued for underground coal mining within the Custer National Forest, with the consent of the Department of Agriculture. In applying this criterion, the authorized officer shall consult with the appropriate managing agencies of these land systems or categories.

> Exemption: The application of this criterion to lands within the listed land systems and categories is subject to valid existing rights.

CRITERION 2 - RIGHT-OF-WAY AND EASEMENTS

Federal lands that are within rights-of-way of easements or within surface leases for residential, commercial, industrial or other public purposes shall be considered unsuitable.

> Exceptions: A lease may be issued and mining operations approved in such areas if the surface management agency determines that:
>
> (i) all or certain types of coal development (e.g., underground mining) will not interfere with the purpose of the right-of-way or easement; or
>
> (ii) the right-of-way or easement was grented for mining purposes; or
>
> (iii) the right-of-way or easement was issued for a purpose for which it is not being used; or
>
> (iv) the parties involved in the right-of-way or easement agree to leasing; or

(v) It is impractical to exclude such areas due to the location of coal and method of mining and such areas or uses can be protected through appropriate stimpulations.

Exemption: This criterion does not apply to lands on which mining would result in substantial loss or reduction of long-range productivity of food or fiber products, and it does not apply to lands: to which the operator made substantial financial and legal commitments prior to January 4, 1977; on which operations were being conducted on August 3, 1977; or which include operations on which a permit has been issued.

CRITERION 3 - BUFFER ZONES ALONG RIGHTS-OF-WAY AND ADJACENT TO COMMUNITIES AND BUILDINGS

Federal lands affected by Section 522(e)(4) and (5) of the Surface Mining Control and Reclamation Act of 1977 shall be considered unsuitable. This includes lands within 100 feet of the outside line of the right-of-way of a public highway or within 100 feet of a cemetary, or within 300 feet of an occupied public building, school, church, community or institutional building or public park or within 300 feet of an occupied dwelling.

Exceptions: A lease may be issued and mining operation approved for lands:

(i) where mine access roads or haulage roads join the right-of-way of the public road;

(ii) for which the Office of Surface Mining Reclamation and Enforcement has issued a permit to have public roads relocated; or

(iii) for which owners of occupied buildings have given written permission to mine within 300 feet of their buildings.

Exemption: The application of this criterion is subject to valid existing rights.

CRITERION 4 - WILDERNESS STUDY AREAS

RECOMMENDED CRITERION

Federal lands designated as wilderness study areas shall be considered unsuitable for coal mining while under review by the Administration and the Congress for possible wilderness designation. For any federal land which may be leased or mined prior to completion of the wilderness inventory by the surface management agency, the environmental impact statement (or analysis) of the lease sale or mine plan must consider whether the land possesses the characteristics of a wilderness study area. If the finding is affirmative, the land shall be considered unsuitable, unless issuance of noncompetitive coal lease and mining on leases is authorized under the Wilderness Act and the Federal Land Policy Management Act of 1976.

Exemption: The application of this criterion to lands for which the Bureau of Land Management is the surface management agency is subject to valid existing rights.

CRITERION 5 - SCENIC AREAS

Scenic federal lands designated by visual resource management analysis as Class I (an area of outstanding scenic quality or high visual sensitivity), but not currently on the National Register of Natural Landmarks shall be considered unsuitable.

A lease may be issued and mining operations approved if the surface management agency determines that mining operations will not significantly diminish or adversely affect the scenic quality of the designated area.

Exemption: This criterion does not apply to lands: to which the operator made substantial financial and legal commitments prior to January 4, 1977; on which operations were being conducted on August 3, 1977; or which include operations on which a permit has been issued.

CRITERION 6 - LANDS USED FOR SCIENTIFIC STUDIES

Federal lands under permit by the surface management agency, and being used for scientific studies involving food and fiber and production, natural resources or technology demonstrations and experiments shall be considered unsuitable for the duration of the study, demonstration, or experiment, except where mining could be conducted in such a way as to enhance, or not jeopardize the original purposes of the study, as determined by the surface management agency, or where the principal scientific user or agency gives written concurrence to all or certain methods of mining.

Exemption: This criterion does not apply to lands: to which the operator made substantial financial and legal commitments prior to January 4, 1977; on which operations were being conducted on August 3, 1977; or which include operations on which a permit has been issued.

CRITERION 7 - HISTORIC LANDS AND SITES

All districts, sites, buildings, structures, and objects of historic, architectural, archaeological, or cultural significance which are included in or eligible for inclusion in the National Register of Historic Places, and an appropriate buffer zone around the outside boundary of the designated property (to protect the inherent values of the property that made it eligible for listing in the National Register) as determined by the surface management agency in consultation with the Advisory Council on Historic Preservation and the State Historic Preservation Office shall be considered unsuitable.

Exception: All or certain types of stipulated mining may be allowed if the surface management agency determines after consultation with the Advisory Council on Historic Preservation and State Historic Preservation Officer that the direct and indirect effects of mining, as stipulated, on a property in or eligible for the National Register of Historic Places will not result in significant adverse impacts to the property.

Exemption: The application of this criterion is subject to valid existing rights.

CRITERION 8 - NATURAL AREAS

Federal lands designated as natural areas or as National Natural Landmarks shall be considered unsuitable.

Exceptions: A lease may be issued and mining operations approved in an area or site if the surface management agency determines that:

(i) with the concurrence of the state, the area or site is of regional or local significance only;

(ii) the use of appropriate stipulated mining technology will result in no significant adverse impact to the area or site; or

(iii) the mining of the coal resource under appropriate stipulations will enhance information recovery (e.g., paleontological sites).

Exemption: This criterion does not apply to lands: to which the operator made substantial financial and legal commitments prior to January 4, 1977; on which operations were being conducted on August 3, 1977; or which include operations on which a permit has been issued.

CRITERION 9 - FEDERALLY LISTED ENDANGERED SPECIES

Federally designated critical habitat for threatened or endangered plant and animal species, and habitat for federal threatened or endangered species which is determined by the Fish and Wildlife Service and the surface management agency to be of essential value and where the presence of threatened or endangered species has been scientifically documented, shall be considered unsuitable.

Exception: A lease may be issued and mining operations approved if, after consultation with the Fish and Wildlife Service, the Service determines that the proposed activity is not likely to jeopardize the continued existence of the listed species and/or its critical habitat.

CRITERION 10 - STATE LISTED ENDANGERED SPECIES

Land containing habitat determined critical or essential for plant or animal species listed by a state pursuant to state law as endangered or threatened shall be considered unsuitable.

Exception: A lease may be issued and mining operations approved if, after consultation with the state, the surface management agency determines that the species will not be adversely affected by all or certain stipulated methods of coal mining.

Exemption: This criterion does not apply to lands: to which the operator made substantial financial and legal commitments prior to January 4, 1977; on which operations were being conducted on August 3, 1977; or which include operations on which a permit has been issued.

CRITERION 11 - BALD AND GOLDEN EAGLE NESTS

A bald or golden eagle nest that is determined to be active and an appropriate buffer zone of land around the nest area shall be considered unsuitable. Consideration of availability of habitat for prey species and of terrain shall be included in the determination of buffer zones. Buffer zones shall be determined in consultation with the U.S. Fish and Wildlife Service.

Exception: A lease may be issued and mining operations approved if:

(i) They can be conditioned in such a way, either in manner or period of operation, that eagles will not be disturbed during breeding season; or

(ii) golden eagle nest sites will be moved with the concurrence of Fish and Wildlife Service.

CRITERION 12 - BALD EAGLE ROOST AND CONCENTRATION AREAS

Bald and golden eagle roost and concentration areas used during migration and wintering shall be considered unsuitable.

Exception: A lease may be issued and mining operations approved if the surface management agency determines that all or certain stipulated methods of coal mining can be conducted in such a way, and during such period of time, to ensure that eagles shall not be adversely disturbed.

CRITERION 13 - FALCON CLIFF NESTING SITES

A falcon cliff nesting site (excluding kestral nest sites) with active nests and a buffer zone of land around the nest sites area shall be con-

sidered unsuitable. Consideration of availability of habitat for prey species and of terrain shall be included in the determination of buffer zones. Buffer zones shall be determined in consultation with the U.S. Fish and Wildlife Service.

> Exception: A lease may be issued and mining operations approved where the surface management agency, after consultation with the Fish and Wildlife Service, determines that all or certain stipulated methods of coal mining will not adversely affect the migratory bird habitat during the period when such habitat is used by the species.

CRITERION 14 - MIGRATORY BIRDS

Federal lands which are high priority habitat for migratory bird species of high federal interest on a regional or national basis, as determined jointly by the surface management agency and the Fish and Wildlife Service, shall be considered unsuitable.

> Exception: A lease may be issued and mining operations approved where the surface management agency, after consultation with the Fish and Wildlife Service, determines that all or certain methods of coal mining will not adversely affect the migratory bird habitat during the periods when such habitat is used by the species.

CRITERION 15 - STATE RESIDENT FISH AND WILDLIFE

Federal lands which the surface management agency and the state jointly agree are fish and wildlife habitat for resident species of high interest to the state and which are essential for maintaining these priority wildlife species shall be considered unsuitable. Examples of such lands which serve a critical function for the species involved include:

- Active dancing and strutting grounds for sage grouse, sharptailed grouse, and prairie chicken;

- Most-critical winter ranges for deer, antelope, and elk; and

- Migration corridors for elk.

A lease may be issued and mining operation approved if, following consultation between the state and the land management agency, it is determined that the coal mining will not have a significant long-term impact on the species being protected.

> Exemption: This criterion does not apply to lands: to which the operator made substantial financial and legal commitments prior to January 4, 1977; on which operations were being conducted on August 3, 1977; or which include operations on which a permit has been issued.

CRITERION 16 - FLOODPLAINS

Riverine, coastal, and special floodplains (100-year recurrence interval) shall be considered unsuitable unless the surface management agency determines, after consultation with the U.S. Geological Survey, that specific leasing can be undertaken without substantial threat of loss to people or property and the natural and beneficial values of the floodplain on the lease tracts and downstream.

Exemption: This criterion does not apply to lands: to which the operator made substantial financial and legal commitments prior to January 4, 1977; on which operations were being conducted on August 3, 1977; or which include operations on which a permit has been issued.

CRITERION 17 - MUNICIPAL WATERSHEDS

Federal lands which have been committed by the surface management agency to use as municipal watersheds shall be considered unsuitable.

Exceptions: A lease may be issued and mining operations approved where:

(i) the surface management agency determines as a result of studies that all or certain stipulated methods of coal mining will not adversely affect the watershed to any significant degree; and

(ii) The municipality (incorporated entity) or the responsible government unit concurs in the issuance of the lease.

Exemption: This criterion does not apply to lands: to which the operator made substantial financial and legal commitments prior to January 4, 1977; on which operations were being conducted on August 3, 1977; or which include operations on which a permit has been issued.

CRITERION 18 - NATIONAL RESOURCE WATERS

Federal lands with National Resource Waters, as identified by states in their water quality management plans, and a buffer zone of federal lands 1/4 mile from the outer edge of the far banks of the water, shall be unsuitable.

Exception: The buffer zone may be eliminated or reduced in size where the surface management agency determines that it is not necessary to protect the National Resource Waters.

CRITERION 19 - ALLUVIAL VALLEY FLOORS

Federal lands identified by the surface management agency, in consultation with the state in which they are located, as alluvial valley floors

according to the definition and standards in the permanent regulations under the Surface Mining Control and Reclamation Act of 1977, and the final alluvial valley floor guidelines of the Office of Surface Mining Reclamation and Enforcement, and approved state programs under the Surfact Mining Control and Reclamation Act of 1977, where mining would interrupt, discontinue or preclude farming, shall be considered unsuitable. Additionally, when mining federal land outside an alluvial valley floor would materially damage the quantity or quality of water in surface or underground water systems that would supply alluvial valley floors, the land shall be considered unsuitable.

CRITERION 20 - STATE PROPOSED CRITERIA

Federal lands in a state to which is applicable a criterion (i) proposed by the state, and (ii) adopted by rulemaking by the Secretary of the Interior, shall be considered unsuitable.

Exceptions: A lease may be issued and mining operations approved when:

(i) such criterion is adopted by the Secretary less than 6 months prior to the publication of the draft land use plan, or supplement to a land use plan, for the area in which such land is included; or

(ii) after consultation with the state, the surface management agency determines mining will not adversely affect the value which the criterion would protect.

Exemption: This criterion does not apply to lands: to which the operator made substantial financial and legal commitments prior to January 4, 1977; on which operations were being conducted on August 3, 1977; or which include operations on which a permit has been issued.

GENERAL EXCEPTION

Federal lands with coal which will be mined by underground mining methods will not be considered unsuitable where the mining will result in no surface effects. Where underground mining will produce surface effects on federal lands to which a criterion applies, those lands will be considered unsuitable unless the conditions exist to permit an exception. Surface effects include surface occupancy, subsidence, fire, and other environmental impacts of underground mining which are manifested on the surface.

Draft
West Decker
TEEA

Activity 4110

EAR # MT-020-78-9-146

TECHNICAL EXAMINATION/ENVIRONMENTAL ASSESSMENT RECORD

(TEEA)

DRAFT

WEST DECKER EXTENSION COAL LEASE APPLICATION

M-37604

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U. S. Department of the Interior - Bureau of Land Management

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PREFACE

The Bureau of Land Management (BLM), U.S. Department of Interior (USDI), is the Federal agency responsible for the management of Federal coal reserves in Montana and other states. As the managing agency, BLM pursues coal development objectives established by the President, Congress, and Secretary of Interior. Through laws, policy, and directives, BLM is pursuing a program of making coal available to help meet national energy needs.

In July 1977, Decker Coal Company applied for a lease on 440 acres of Federal coal to supplement its existing West Decker operation near Decker, Montana. The company is currently mining existing Federal leases adjacent to the 440-acre tracts. The additional Federal coal is desired as it could be efficiently and economically mined as part of the West Decker Mine. The BLM feels it is necessary to act on this application in order to prevent bypassing coal as the company completes mining the adjacent area and moves to another location.

Three environmental processes must be accomplished by BLM before making recommendations for coal leasing to the Secretary of Interior. These are comprehensive land-use planning, an environmental assessment of the action, and a technical examination of the area involved in the proposed action.

Following public review (including State and local governments) of this Technical Examination and Environmental Assessment (TEEA), and initial

conclusions, a "decision statement" is completed. The "decision statement" will include the final recommendation to lease or not lease; a review and discussion of use of public input; and a reiteration of criteria from initial conclusions.

The lease and the casefile is then forwarded to the BLM State Director. If the recommendation is to act favorably upon the lease, U.S. Geological Survey (USGS) is requested to make a value determination of the coal reserves and the Montana Department of State lands will be consulted to assure all lease stipulations conform to existing state laws and regulations. The case is then forwarded to the Secretary of Interior for final approval. The Secretary consults with the Governor of Montana prior to making a decision to lease.

The foregoing discussion explains the process being used for the Decker Coal Company application (M-37604). The following text is the documentation of the process. This publication of the text will not include the decision statement. The statement will be done as a supplement to this document. Public comment received will be used in making the final decision and will be discussed in the decision statement.

Introduction

INTRODUCTION

Decker Coal Company has applied for a competitive coal lease on 440 acres of additional Federal coal adjacent to West Decker Mine which contains a total of approximately 3,237 acres at Decker, Montana. This assessment examines and records the possible impacts that may result if the lease is granted. Physical and biological impact assessments are generally limited to the proposed lease area. Air, water, and socio-economic factors are assessed on a broader scale.

The previously leased coal in the Decker Area is part of a larger complex of coal mines for which a site-specific environmental impact statement was prepared by The United States Department of the Interior (USDI), Geological Survey (USGS), and the State of Montana, Department of State Lands (DSL). Production would be scheduled to start in the lease application area in 1980. Consequently, an immediate decision by the Bureau of Land Management (BLM) and USDI is mandatory. If the decision is not made in a timely manner the coal would be bypassed; the area would still be impacted by surrounding coal mining, and the coal resource would be committed to non-use because it would not be economically feasible to mine the bypassed coal in the foreseeable future. The reserves are needed to meet existing contracts between Decker Coal and Detroit Edison, Commonwealth Edison, and Austin Power of Austin, Texas.

The project area fits into a logical-mining unit (LMU) with the existing leases in the West Decker Mine. It is not a LMU by itself nor does

it fit with another LMU. If leased, the project area will help to maximize the recovery of coal in the West Decker Area.

Only the impacts which are expected to occur as a result of strip mining the proposed 440-acre lease-consideration areas will be evaluated in this Technical Examination and Environmental Assessment. This will also include those impacts that have a cummulative effect on resources already affected by existing mining operations in the area.

SUMMARY

This Technical Examination and Environmental Assessment indicates that mining the additional coal would cause only minor additional environmental impacts beyond those which would occur as a result of mining the existing leases. The proposed lease would facilitate a more efficient and practical mining and reclamation plan and would prevent the loss of coal adjacent to the existing leases. This is referred to as a loss of coal or bypass because present and foreseeable mining economics may not permit a later return to mine the remaining coal after the adjacent area has been mined and reclaimed.

Mitigation measures as outlined in the TEEA would negate the majority of these impacts. However, if mitigating measures are not successful or unforeseen catastrophes occur, some impacts could occur and become signigicant on a cumulative basis.

Chapter 1 - Proposed Action

Chapter 1

PROPOSED ACTION

The proposed action is the leasing of, for the purpose of surface mining, 440 acres of federal coal under the emergency leasing criteria as defined in the 43 Code of Federal Regulations, part 3425.

The proposed action is not a mining plan and does not include existing operations in the area.

The lease must be bid upon competitively and it is possible that someone other than the applicant may obtain the lease. The use of the applicant's plans as part of the proposed action is to determine the likely consequences of leasing and does not indicate a preference on the part of the BLM. Should a bidder other than the applicant be awarded the lease, their plans would be assessed before consideration is given to approving the mining plan.

Should a lease be issued, a mining plan would be developed in accordance with the applicable Office of Surface Mining regulations and any mitigation measures developed in this TEEA. The mining plan would be developed through coordination and consultation between the Bureau of Land Management, Office of Surface Mining, and the appropriate state agencies.

Decker Coal Company has made application to lease an additional 440 acres of federal coal located in Township 9 South, Range 40 East, Section 8: N½SE¼, SW¼SE¼, SE¼NE¼, Section 9: W½NW¼, Section 17: E½SW¼, Section 20: NW¼NE¼, E½NE¼, Big Horn County, Montana. These tracts lie adjacent to the west end of the Company's existing lease M-061685. Decker Coal proposed to mine approximately 160 acres of the application area as part of the West Extension of its existing operation. The West Extension area is located four miles northeast of Decker, Montana; twenty-one miles northeast of Sheridan, Wyoming; and forty miles southwest of Ashland, Montana (Map 1-1). The surface ownership of the application area is as follows:

	Section 8	Section 9	Section 17	Section 20
BLM	40	80		40
Decker Coal Co.	120			
Consolidation Coal Co.			80	80
TOTAL	160 ac.	80 ac.	80 ac.	120 ac.

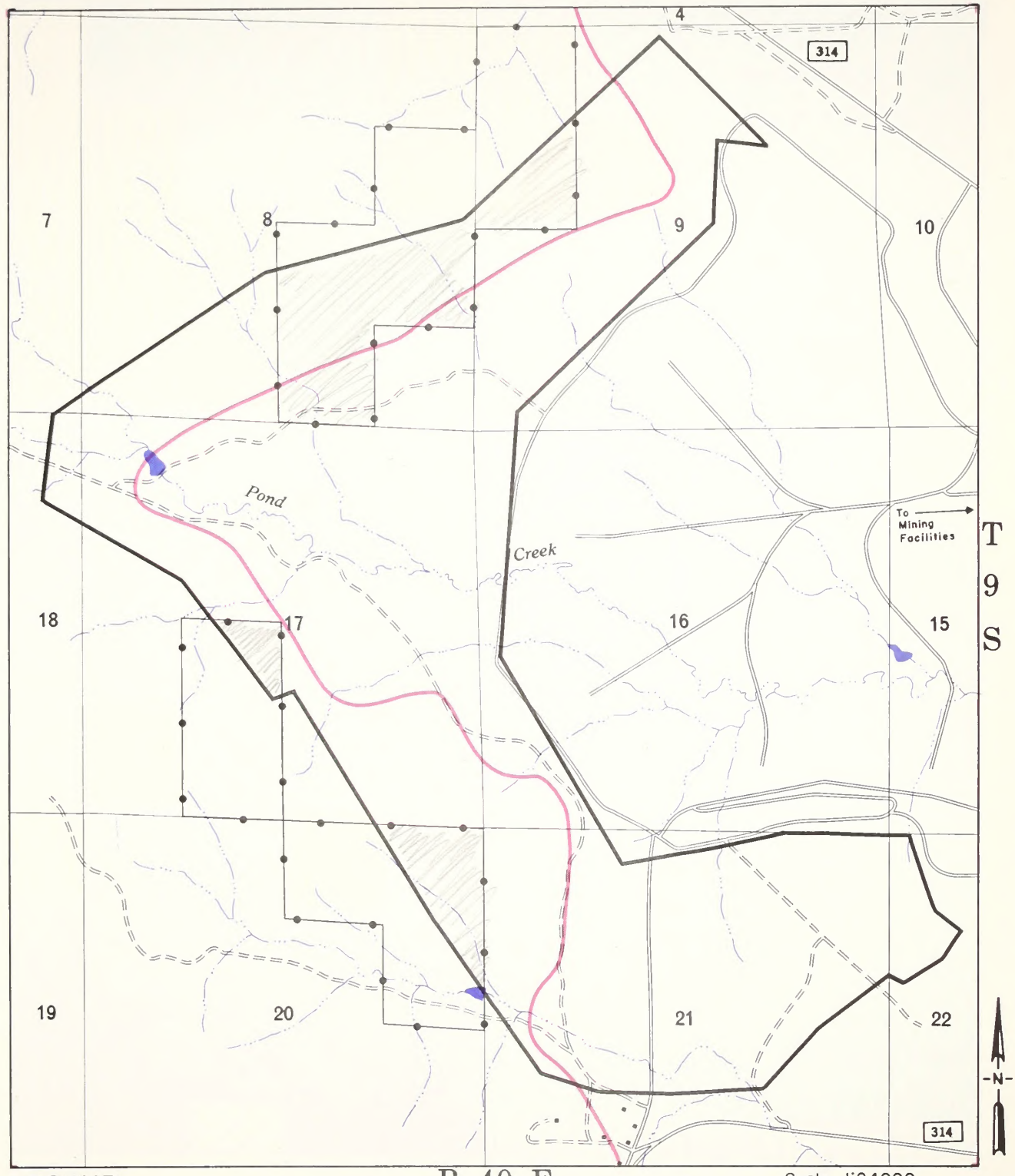
The federal coal within the application area is shown on Map 1-2.

Decker Coal Company states the reserves in the West Extension area would be used to meet existing contracts between Decker Coal and the City of Austin, Commonwealth Edison Company and Detroit Edison.

The BLM in consultation with the U.S. Geologic Survey (USGS) has determined that the application area is not a logical mining unit (LMU) by itself

MAP L-1

LEASE RECOMMENDATION AREA



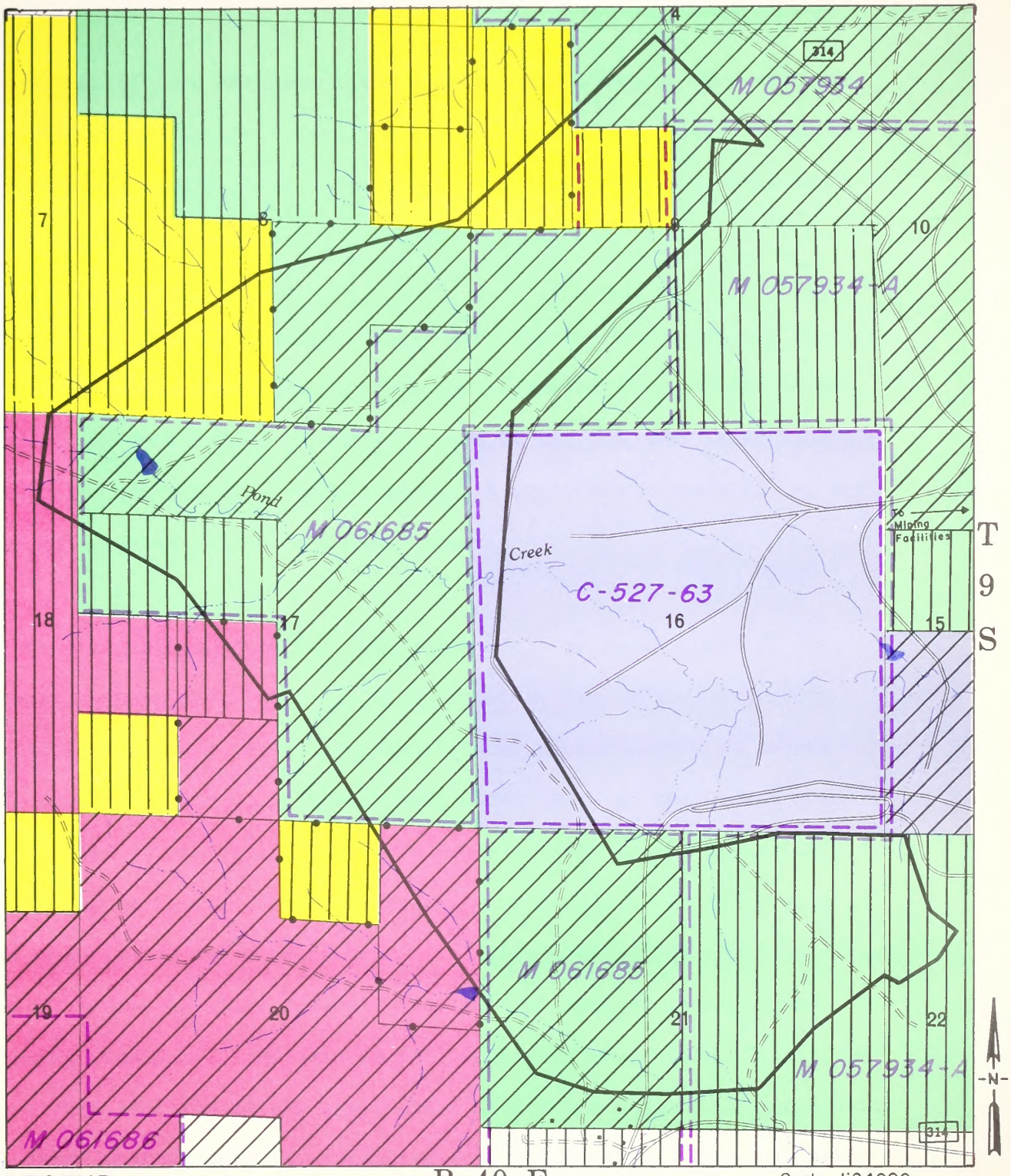
LEGEND

Mine Limits

Lease Application M37604

Approximate location of 150' overburden line

MAP 1-2
OWNERSHIP



LEGEND

- Mine Limits
- Lease Application M37604
- All Minerals (U. S.)
- Coal only (U. S.)
- Public Land
- State of Montana
- Decker Coal Company
- Consolidation Coal Company

Existing Federal and State Coal Leases

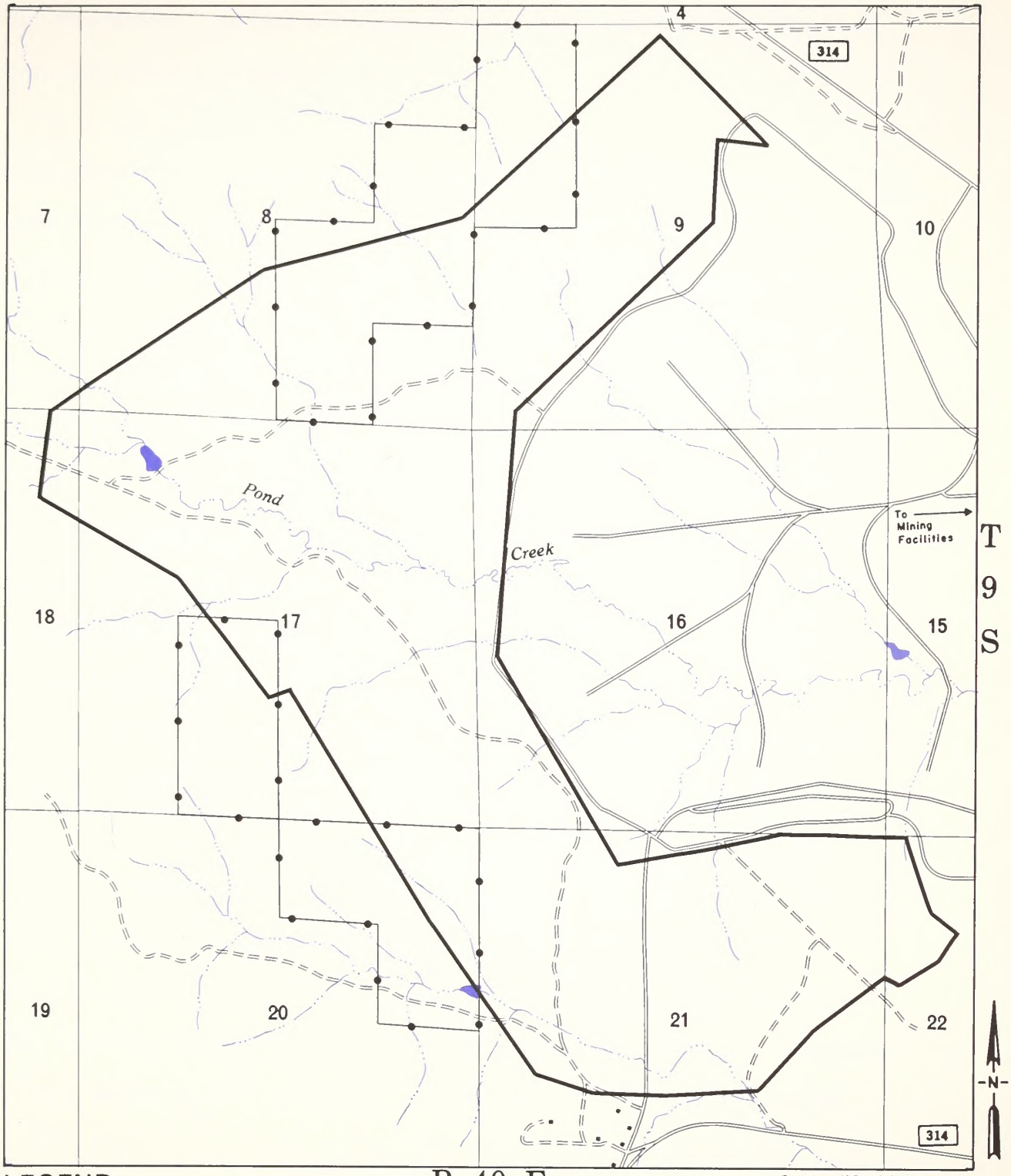
and that it is part of the LMU of the proposed West Decker expansion. If mined, this area would help to maximize the recovery of coal in the West Decker Mine.

The Bureau of Land Management and the Geological Survey have made the determination that the federal coal under application meets the emergency leasing criteria as defined in the 43 Code of the Federal Regulations, part 3425.

The BLM's Management Framework Plan (MFP) for the Decker-Birney Planning Unit, recommends leasing strippable coal reserves in a portion of the application area. Even though a portion of the proposed lease lies within the current MFP, approximately 316 acres are outside of the MFP area considering leasing and development.

Of the 440 acres applied for, 160 acres would be strip mined if the proposed mining plan (Map 1-3) is approved by the Office of Surface Mining (OSM). This would be an addition of approximately 3% to the existing 14,370 acres of federal coal under lease in the Decker area. The leasing of the application area would provide an additional 14,268,696 tons of Deitz 1 coal. Also the issuance of the lease would provide access to 10,968,890 tons of Deitz 1. This coal, which although already leased, cannot be mined logically due to the required slope of the highwall reduction. The gain in coal recovered would total 25,237,586 tons. The addition of the application area would allow the continuation of mining operations at a production level of 8 million tons per year.

MAP 1-3
LEASE APPLICATION AREA



LEGEND

Mine Limits

Lease Application M37604

Although the operation would continue at the same production level, the Decker Coal Company has stated that an addition 26 workers may be required to operate additional equipment needed to remove the relatively deep overburden. Surface disturbance would occur at a rate of approximately 100 acres per year.

The proposed mining operation would utilize dragline and single-pit mining techniques with a progression in a westerly direction to remove the Deitz 1 coal seam. With this type of operation, and under existing time frames, the coal in sections 18 and 20 would be bypassed by the last half of 1980. The coal in sections 8 and 9 would likewise be bypassed by the last half of 1981, if leases are not issued.

The first step in the proposed mine plan calls for the removal, separation, and storage of both topsoil and subsoil in two separate operations. This would be done by staking the depth of the topsoil in accordance with existing soil surveys prior to its removal. The topsoil and subsoil would be stockpiled separately. With proper shaping, positioning, and seeding, wind and water erosion would be kept at a minimum.

The mining sequence would be accomplished by utilizing a selfloading scraper to remove all available topsoil. Due to exceptionally thick overburden within the application areas a substantial amount of overburden would be stripped with a front end loader, truck assist operation down to a depth of 140' above the top of coal. The remaining 140' of

overburden would be stripped with a 70 cubic yard dragline exposing the D_1 Coal Seam. The coal is then drilled and blasted, for ease of loading and loaded into 150-ton haul trucks by 16-cubic yard and 30-cubic yard coal loading shovels. After loading, the coal is then hauled to the coal handling facility for crushing and train loadout operations (see Map 1-4). Reclamation would include three distinct operations: regrading, topsoiling, reseeding.

Reclamation would begin with filling the mined pits with the overburden from the next succeeding cut. The overburden would be regraded to obtain a surface similar to the original topography and drainages. Regrading would occur within one year following the mining operation.

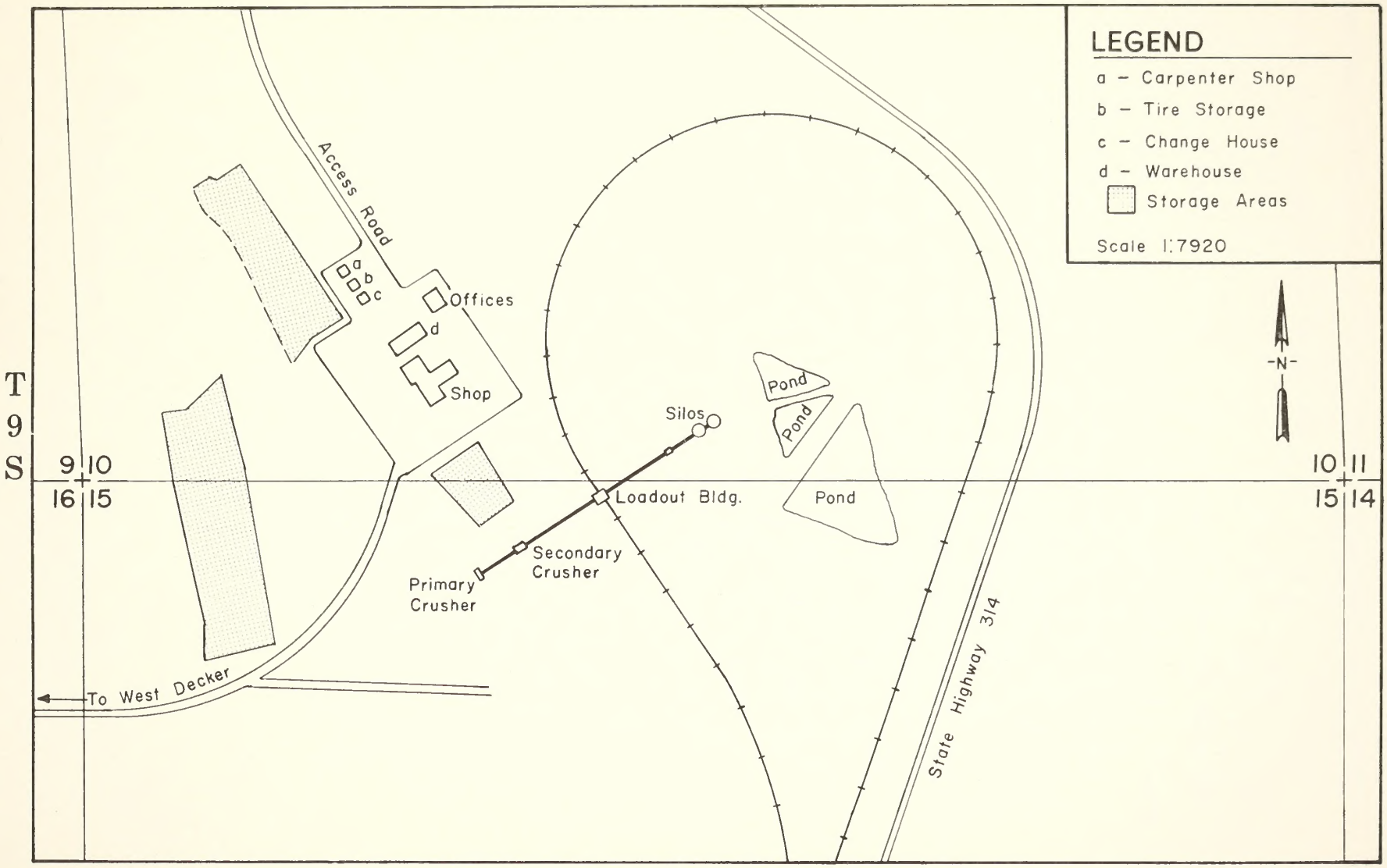
Following regrading, subsoil would be spread on the regraded overburden. Topsoil would then be replaced on the subsoil. The topsoiling operation would be performed by selfloading scrapers during appropriate seasons of the year to minimize the loss of material.

The seeding operation would involve site preparation (such as contour plowing), and reseeding to native vegetation. This could include the use of a bulldozer, but normally would be done by farm implements.

The original drainage systems would be recreated to the maximum extent possible, however, slopes would vary based on state regulations. The reclaimed surface would then provide forage and habitat for livestock and wildlife. Post mining land use would be predominately livestock grazing.

MAP 1-4

EXISTING MINING FACILITIES



R 40 E

All mining and reclamation activities would be performed in accordance with current federal and state standards.

Related activities include mining at the present West Decker Mine and the East Decker Mine. Spring Creek Coal Company has received a permit to open a mine in Spring Creek west of the North Extension Mine and north of the application area.

Approval of this application would not require construction or relocation of additional or existing public roads or rail systems.

Chapter 2 - Description of the Environment

Chapter 2

EXISTING ENVIRONMENT

Air Quality

The existing, ambient air quality in the Decker area is based largely on the results of monitoring conducted by the Montana Department of Health and Environmental Sciences, Air Quality Bureau. The results of that monitoring were summarized by David Maugham of the Air Quality Bureau and included in the Final Environmental Impact Statement (FEIS). These results show that a continuous effect in coal mining would have little additional air quality impact on the area.

The Environmental Protection Agency has designated the Decker area as Class II air quality, which means the maximum allowable average geometric mean for total suspended particulates is about 30 ug/m^3. The average geometric mean for total suspended particulates for the Decker area is within the National Ambient Air Quality Standards (primary and secondary). The present air quality condition for the area is good.

Topography

The Decker area is located on the western edge of the Great Plains

Physiographic Province. Elevations in the area range from 3400 to 4000 feet. The valley of the northeastward flowing Tongue River is the most dominant geomorphic feature in the area. The valley bottom is somewhat wider and flatter in this area than corresponding localities upstream and downstream. This feature has been utilized by the construction of a dam to form the Tongue River Reservoir.

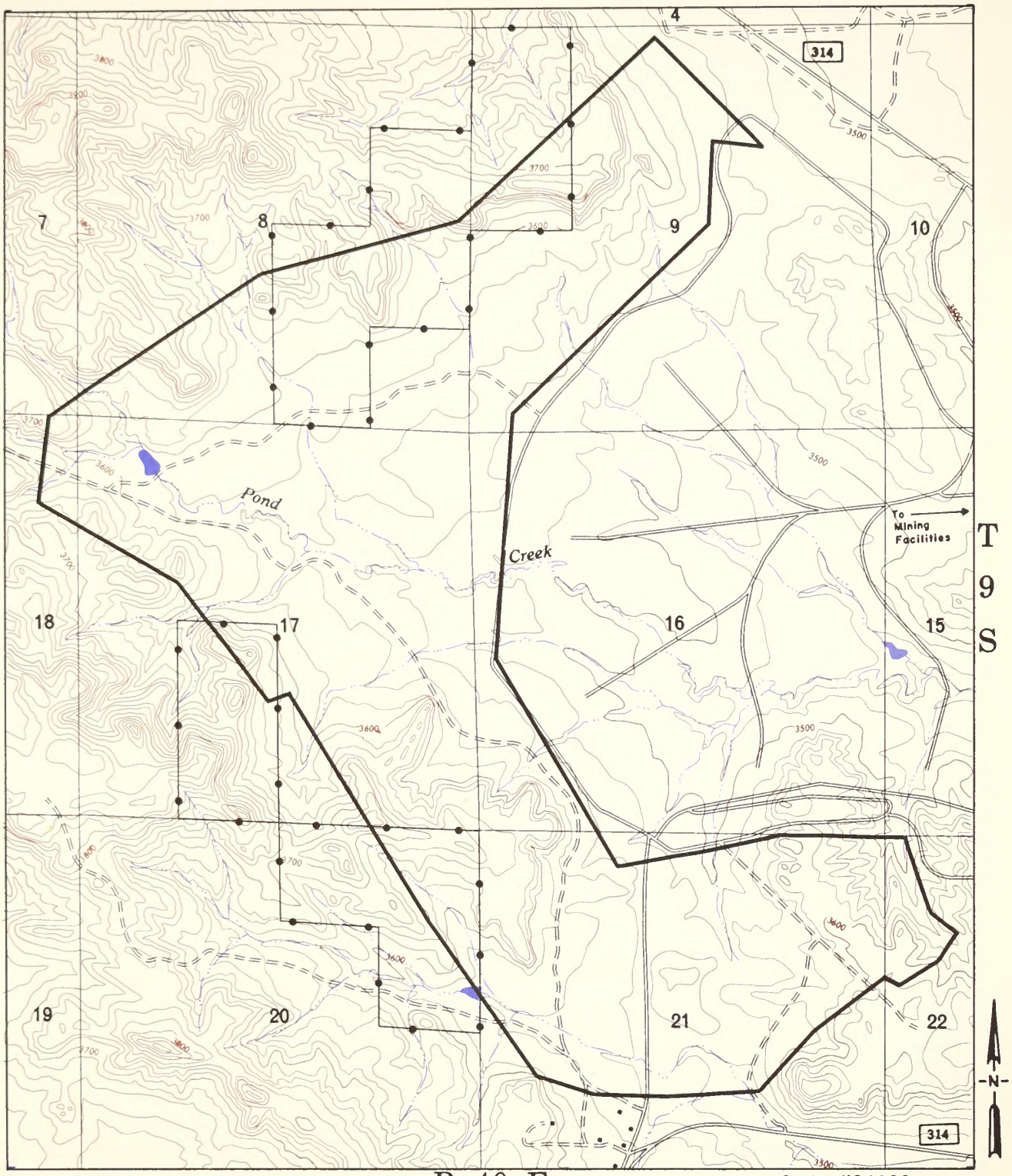
Southeastward flowing streams drain the general area west of the Tongue River and form a rolling, locally hummocky terrain characterized by flat ridge tops and slopes generally less than 10 percent. Moving westward the drainages narrow rapidly and the rolling terrain gives way to form steep-sided, broad, high interstream areas that contain local badland topography. The application area encompasses the eastern margin of two ridges and exhibits locally steep slopes (+ 20%) as well as gently sloping terrain. (Map 2-0).

Geology

The geology of the Decker area has been described in detail by Baker, 1929; Matson and Blumer, 1973; and Law and Grazis, 1973.

Sedimentary formations ranging in age from Cambrian to Holocene locally have an aggregate thickness of about 12,000 feet. Sediment deposited by the transgression of Paleozoic and Mesozoic seas account for most of this accumulation. Strata exposed at the

MAP 2-0
TOPOGRAPHY



LEGEND

Mine Limits

Lease Application M37604

surface consists of the Paleocene Fort Union Formation, Eocene Wasatch Formation, and recent alluvial deposits.

The Fort Union Formation is composed of an interbedded sequence of shales, siltstones, sandstone, and coal. Total thickness of the formation in the Decker area is approximately 3400 feet. Much of the formation was deposited in an environment that was continuously changing from floodplain to river channel to Deltaic swamp. For this reason the lithology often changes rapidly over short distances. The Tongue River Member is the uppermost component of the formation in this region and the most important in terms of coal resource. The Tullock and Lebo Shale Members make up the remainder of the formation, but are not exposed in this area.

A sequence of interbedded claystone, shale, siltstone, sandstone and thin coal beds makes up the Wasatch Formation. Much of the formation has eroded away except at higher elevations to the east and west of the proposed lease area.

Recent alluvial deposits are found in the bottoms of all the larger stream drainages in the Decker area. Unconsolidated silt, sand, and gravel reach a maximum thickness of approximately 100 feet in the Tongue River Valley. Most other drainages contain less than 40 feet of these deposits.

The proposed lease area is on the western edge of the Powder River Basin. Most of the strata within this structural basin are relatively flat-lying with a regional dip that seldom exceeds 1 degree. Locally, bedding displays minor folding and faulting with displacements generally less than 15 feet. The southwest limit of the West Decker Mine is bounded by a normal fault which has displaced beds as many as 240 feet.

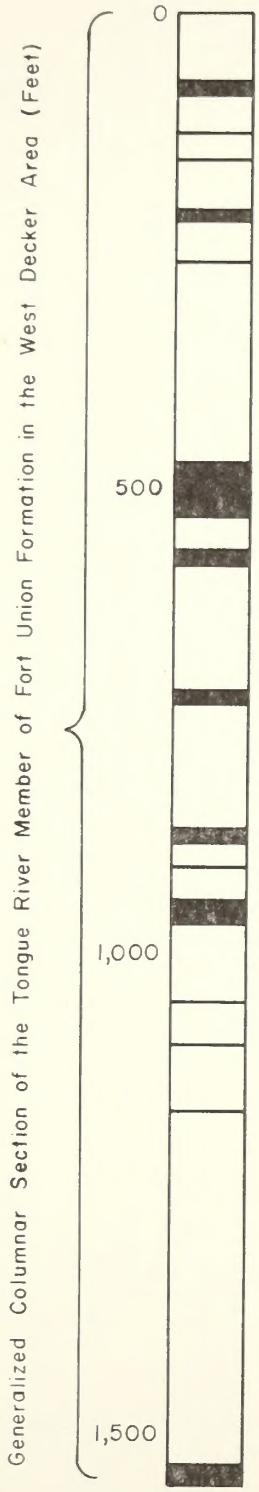
Coal

The Tongue River Member contains as many as 10 persistent coal beds. The thickness of interburden between coal beds often changes from place to place, varying as much as 100 feet over a distance of a mile. The Anderson and Dietz beds have merged in the West Decker Mine area to form a single seam about 52 feet thick (Figure 2-1). This merging or coalescence has also occurred in other beds in this region which hampers the correlation of beds with other areas. The Dietz 2 seam is approximately 19 feet thick in the subject area.

Coal in the Decker area is low in sulfur and has a heating value of 9000 to 9900 Btu per pound (Table 2-1). According to the American Society for Testing Materials this coal ranks as subbituminous B.

Identified and inferred coal reserves underlying the proposed lease area amounts to approximately 37 million tons in the Anderson-Dietz 1 (D_1) seam and 15.7 million tons in the Dietz 2 (D_2) seam.

FIGURE 2-1
STRATIGRAPHIC COLUMN



NAME	THICKNESS (FT)	DECKER COAL CO. NAMES
ROLAND COAL	8-12	
SQUIRREL CREEK COAL	2-5	
SMITH COAL	7-26	
)-ANDERSON COAL	15-35	D-1 UPPER COAL
)-DIETZ 1 COAL	10-22	D-1 LOWER COAL
DIETZ 2 COAL	12-28	D-2 COAL
CANYON (OR MONARCH) COAL	14-22	D-3 COAL
WALL (OR CARNEY) COAL	11-28	
A COAL	5-20	
D COAL	8-16	

Source: Matson and Blumer 1973, Law and Grazis 1973.

TABLE 2-1

WEIGHTED AVERAGES OF SELECTED SAMPLES OF ANDERSON-DIETZ$_1$ AND DIETZ$_2$ COAL SEAMS IN THE DECKER AREA

ANDERSON-DIETZ$_1$

Analysis	Proximate
% Moisture	23.94
% Ash	4.14
% Volatile	31.52
% Fixed Carbon	40.39
% Sulfur	0.32
Btu, per pound	9535

DIETZ$_2$

Analysis	Proximate
% Moisture	24.50
% Ash	5.55
% Volatile	29.05
% Fixed Carbon	41.24
% Sulfur	0.40
Btu, per pound	9210

The Decker Coal Company contends that the $Dietz_2$ seam cannot currently be economically mined. They site a combination of reasons for this. Among them are the lower Btu value and the thickness of overlying material. (Average interburden between the D_1 and D_2 seam is about 40 feet.)

Trace element analysis of the D_1 seam is given in Table 2-2. No unusual concentrations of trace elements were found in the D_1 as compared with coal in other parts of the Powder River Basin.

Minerals Other Than Coal

There are no known resources of oil and gas in the Decker area. The Ash Creek field, about eight miles to the west, is the nearest producing field. Five oil and gas wildcat holes have been drilled in the Decker area to test several Cretaceous formations. Although the holes were dry, undiscovered resources of oil and gas may underlie the area at greater depths.

The baking or fusing of siltstone and shale from the natural burning of coal has produced a prominent rock type locally referred to as scoria. The fused rock is usually more resistant than the other strata and caps many of the hills and ridges in the area. The resistance or hardness imparted to the scoria makes it suitable as a road surfacing material and as riprap for railroad beds. The

TABLE 2-2

COAL ASH ANALYSIS ON SELECTED SAMPLES OF ANDERSON-DIETZ$_1$ AND DIETZ$_2$ COAL

ANDERSON-DIETZ$_1$

Analysis	Percent
Silicon Diozide (SiO_2)	33.92
Aluminum Oxide (AL_2O_3)	19.79
Titanium Dioxide (T_1O_2)	.64
Phosphorus Pentoxide (P_2O_5)	.90
Iron Oxide (Fe_2O_3)	6.86
Calcium Oxide (Cao)	20.28
Magnesium Oxide (MgO)	3.63
Potassium Oxide (K_2O)	.53
Sodium Oxide (Na_2O)	6.36
Sulfur Trioxide (SO_3)	

DIETZ$_2$

Silicon Dioxide (SiO_2)	38.39
Aluminum Oxide (AL_2O_3)	19.52
Titanium Dioxide (T_1O_2)	.49
Phosphorus Pentoxide (P_2O_5)	1.04
Iron Oxide (Fe_2O_3)	9.16
Calcium Oxide (CaO)	16.27
Magnesium Oxide (MgO)	2.59
Potassium Oxide (K_2O)	.71
Sodium Oxide (Na_2O)	5.24
Sulfur Trioxide (SO_3)	4.00

abundance of this material generally dictates the operation of small pits near places where it is needed.

No other locateable and leaseable minerals are known to exist in the subject area.

Paleontology

Information on life forms or natural environments are usually non-existent where bones or plant remains have been deposited in floodplain environments such as those occurring in the subject area. In addition, as carbonaceous swamp material is metamorphosed into coal, the evidence of plant or animal remains are usually destroyed.

Although no major discoveries have been reported from the Decker area, it is not known whether significant paleontological resources exist within the application boundaries.

Soils

Soils of the application area are grouped into two major classes: alluvial and residual.

The alluvial soils occur on the floodplains, valley bottoms, terraces and fans where sediments derived from erosion of the uplands have accumulated. They are characterized by well developed Aridisols

and represent the most suitable soils in the area for sources of topsoil (Map 2-1. Tables 2-3, 2-4, 2-5, 2-6, 2-7, and 2-8).

The residual soils are in the early stages of development and have thin rocky topsoil that is similar in character to the underlying parent materials. These poorly developed Entisols are found on ridges, knolls and hillsides on the bedrock uplands. Most of these soils are poorly suited for topsoil sources (Map 2-1, Tables 2-3, 2-4, 2-5, 2-6, 2-7, and 2-8).

TABLE 2-3

SOIL MAPPING UNITS

Mapping Symbol	Name	Slopes
Fm	Fort Collins Loam	4 to 8%
Hlc	Heldt Silty Clay Loam	4 to 8%
Hle	Heldt Silty Clay	0 to 2%
Hnf	Hydro Silty Clay Loam	2 to 4%
Hng	Hydro-Allentine Complex	1 to 4%
Ls	Lohmiller Silty Clay Loam	8 to 15%
Ms	McRae Loam	4 to 8%
MVf	Midway-Thedalund Complex, Hilly	15 to 35%
SOc	Shale Outcrop-Midway Complex, Steep	25 to 90%
THd	Thedalund-McRae Loams, Dissected	4 to 35%
THn	Thedalund-Wibaux Stony Loams, Hilly	15 to 45%
THo	Thedalund-Wibaux Complex, Very Steep	35 to 90%
To	Thurlow-Midway Silty Clay Loams	4 to 15%
Wr	Wibaux-Spearman Complex, Rolling	8 to 15%

TABLE 2-4

SOIL RECONSTRUCTION MATERIAL
RATING BY SERIES

Allentine	0-4" Fair, too clayey; 4-60" Poor, too clayey
Chugter	0-16" Good; 16-40" Fair, excess lime
Fort Collins	0-18" Good; 18-60" Fair, excess lime
Heldt	0-60" Fair, too clayey, excess lime
Hydro	0-5" Good; 5-60" Poor, excess salt
Kim	0-60" Fair, too clayey, excess lime
Lohmiller	0-6" Fair, too clayey; 6-60" Poor, too clayey, excess lime
McRae	0-5" Good; 5-60" Fair, excess lime
Midway	0-14" Poor, erodes easily; 14"+ Unsuitable
Rock Outcrop	Unsuitable
Shale Outcrop	Unsuitable
Spearman	0-23" Fair, too clayey, large stones; 23"+ Unsuitable
Thedalund	0-8" Fair, excess lime; 8-28" Poor, excess lime; 28"+ Unsuitable
Thurlow	0-13" Fair, too clayey; 13-60" Poor, excess lime, too clayey
Wibaux	0-9" Fair, large stones; 9-60" Unsuitable

TABLE 2-5

SECTION 8

Soil Mapping Unit	Approximate Surface Acres	%	Topsoil Suitability Good Ac.Ft.	Fair Ac.Ft.	Poor Ac.Ft.
Fm	13	8.1	19.5	45.5	---
Hlc	35	21.9	---	175.0	---
MVf	64	40.0	---	10.7	71.7
Hng	7	4.4	2.0	.7	32.2
THd	1	.6	.2	2.6	.8
THn	17	10.6	---	10.1	15.7
To	7	4.4	---	4.1	20.2
SOc	16	10.0	---	---	8.4
	160	100 %	21.7	248.7	149.0
			14' of topsoil	1.55' of subsoil or topsoil	.93' of parent material

TABLE 2-6

SECTION 9

Soil Mapping Unit	Approximate Surface Acres	%	Topsoil Suitability Good Ac.Ft.	Fair Ac.Ft.	Poor Ac.Ft.
MVf	27	34.0	---	4.6	30.4
SOc	13	16.0	---	---	7.0
THd	1	1.0	.2	2.6	.8
THn	1	1.0	---	.6	.92
To	38	48.0	---	22.4	109.4
	80	100 %	.2	30.2	148.5
			.00' of topsoil	.38' of subsoil or topsoil	1.86' of parent material

TABLE 2-7

SECTION 17

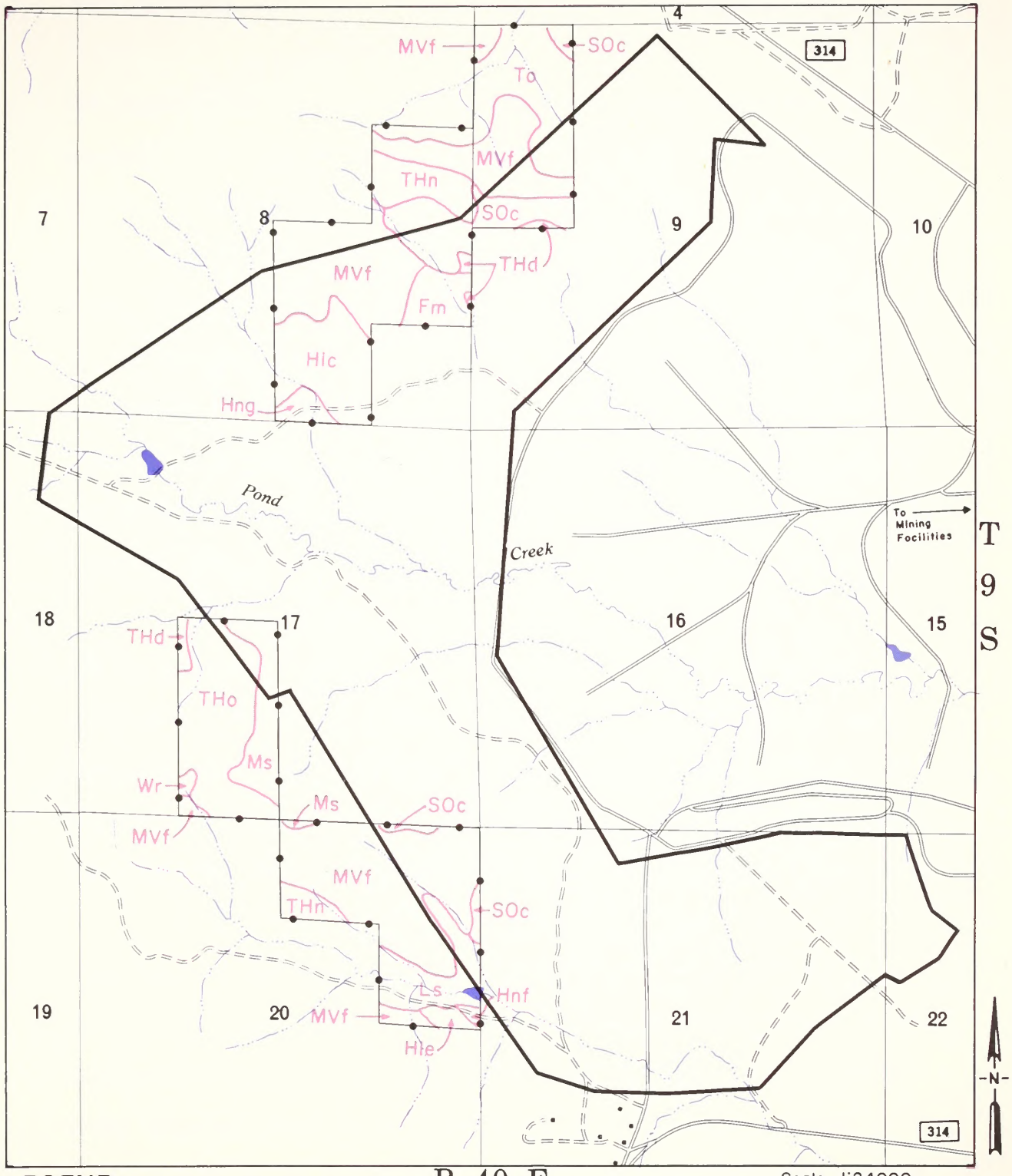
Soil Mapping Unit	Approximate Surface Acres	%	Topsoil Suitability Good Ac.Ft.	Fair Ac.Ft.	Poor Ac.Ft.
Ms	21	26.3	8.8	251.9	---
THd	3	3.7	.5	8.0	2.5
THo	52	65.0	---	27.4	39.1
MVf	2	2.5	---	.3	2.2
Wr	2	2.5	.1	2.5	---
	80	100 %	9.4	290.1	43.8
			.12' of topsoil	3.63' of subsoil or topsoil	.55' of parent material

TABLE 2-8

SECTION 20

Soil Mapping Unit	Approximate Surface Acres	%	Topsoil Suitability Good Ac.Ft.	Fair Ac.Ft.	Poor Ac.Ft.
Hle	3	2.5	---	15.0	---
Hnf	1	.8	.4	---	4.6
Ls	24	20.0	---	12.0	108.0
MVf	80	66.7	---	13.4	89.6
Ms	1	.8	.4	4.6	---
SOc	3	2.5	---	---	1.7
THn	8	6.7	---	3.2	7.4
	120	100 %	.8	48.2	211.3
			.01' of topsoil	.40' of subsoil or topsoil	1.76' of parent material

MAP 2-1
SOILS



LEGEND

R 40 E

Scale 1:24000

Mine Limits

Lease Application M37604

Hydrology

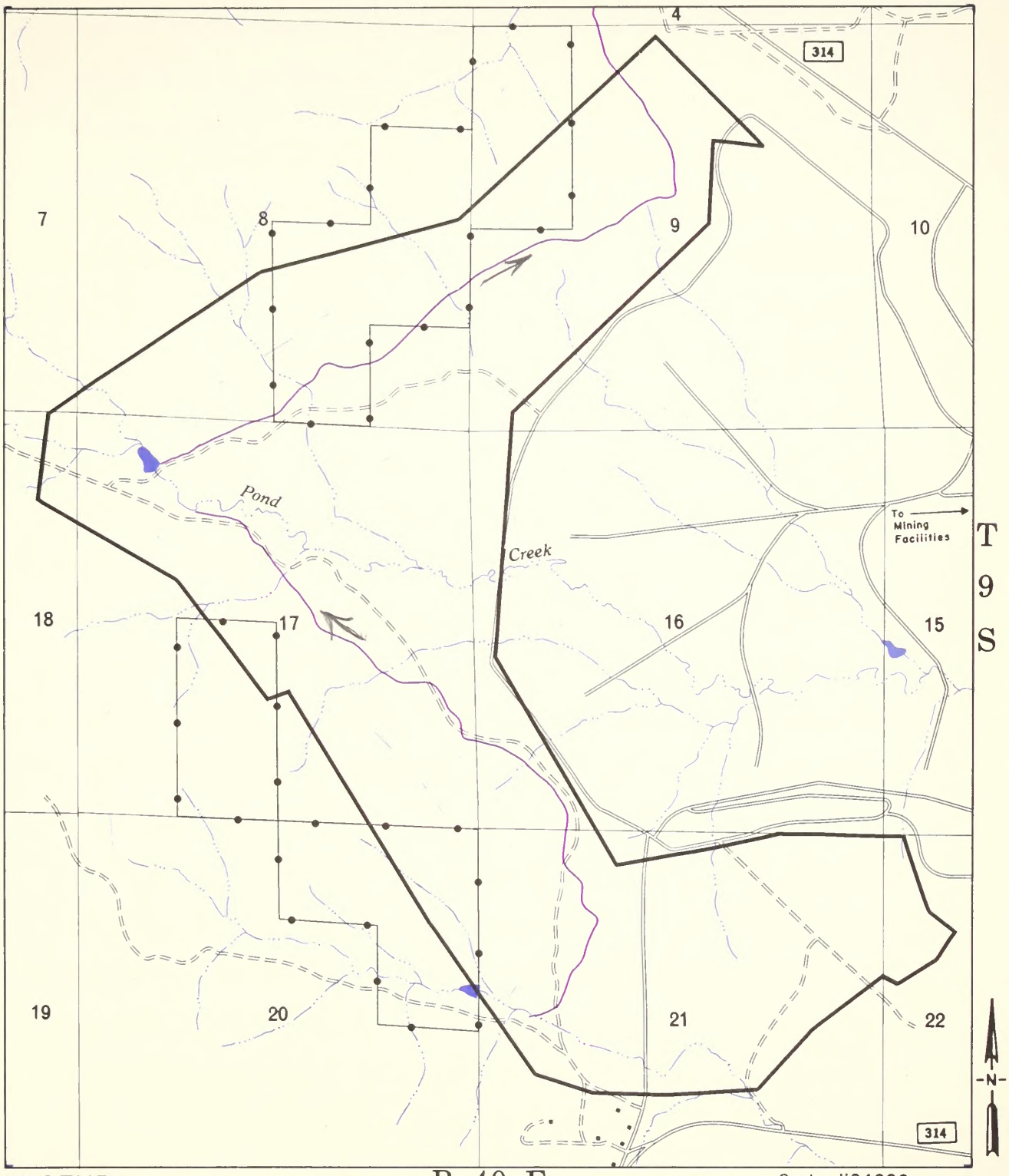
Surface Water

The application areas lie within the Tongue River Basin and are drained by two ephemeral creeks (Map 2-2). Pond Creek drains the southern application area (in sections 17 and 20) by way of a diversion ditch from a retention dam in the NW¼ of section 17, T.9S., R.40E. Pond Creek runs into the Tongue River just upstream of the Tongue River Reservoir. A retention pond is located in section 20 of the application area on Pond Creek. Pearson Creek drains the northern application area (in sections 8 and 9) with the assistance of another drainage ditch. Pearson Creek drains directly into the Tongue River Reservoir.

The Tongue River Reservoir was constructed in 1940 with a capacity of 72,000 acre-feet, but sediment deposition has reduced it to an estimated 1975 capacity of 60,000 acre-feet (USGS/MDSL, 1977). It inundates an area of 3,500 acres when full. The reservoir is used primarily for water storage for irrigation in the valley downstream.

Pond Creek is fed by a 6.1 square mile watershed and Pearson Creek drains 8.5 square miles. The southern diversion ditch drains a 475 acre portion of the Pond Creek basin. The northern ditch diverts water from 389 acres of the Pond Creek watershed into Pearson Creek. Unit annual runoff is expected to be greater in the smaller,

MAP 2-2
DRAINAGE DIVERSIONS



LEGEND

Mine Limits

Lease Application M37604

Diversion Ditches

steeper Pond Creek watershed (0.4 inch) than the Pearson Creek basin (0.2 inch) which is underlain by large areas of permeable clinker (USGS/MDSL, 1977). Based on the unit values, pre-mining annual runoff is estimated to be 130 acre-feet from Pond Creek, and 90 acre-feet from Pearson Creek. The estimate from the Pond Creek watershed does not include diverted water. Peak discharge for the 100-year storm prior to mining is estimated to be 2,200 cfs for Pond Creek and 1,700 cfs for Pearson Creek (derived from calculations done by USGS/MDSL, 1977).

Water quality of the Tongue River has been measured at the previously mentioned gaging station since 1965. A summary of the record for the period October 1, 1965, to September 30, 1969 is given in Table 2-9. Additional water quality data has been collected one-half mile downstream from the Tongue River Dam and published for the period of October, 1975, through September, 1976. Table 2-10 shows a summary of this data. The chemical quality of the reservoir water is very similar to that of the Tongue River. The water in the reservoir and the Tongue River immediately downstream from the dam has been classified by the State of Montana as $B\text{-}D_2$, suitable for drinking, culinary, and food processing after adequate treatment of coagulation, sedimentation, filtration, and disinfection has been made.

No water quality data is available for Pearson or Pond Creek. However, some analysis has been done on Spring Creek which is immediately north of Pearson Creek. Measurements of dissolved solids for Spring Creek and South Fork Spring Creek range from about 1,200 milligrams per liter (mg/l) during periods of high flow to about 2,500 mg/l during periods of low flow when mostly groundwater contributed to the flow. Similar results would be expected in Pearson Creek (USGS/MDSL, 1977).

Sediment yields have not been measured on Pond or Pearson Creek, but values were estimated based on the universal soil-loss equation by the U.S. Geological Survey and the Montana Department of State Lands (1977). Pond Creek had an average annual sediment yield of 680 tons/square mile or 4,100 tons total. Pearson Creek had an average annual sediment yield of 580 tons/square mile or 4,900 tons total.

Groundwater

Aquifers of alluvium, clinker and Anderson-Dietz 1 and Dietz 2 coal seams are found in the application area. The clinker and alluvium aquifers are more permeable and permit higher individual water yields, but are utilized less due to their limited areal extent. Alluvium material in the Pond Creek area contains perched aquifers which obtain their moisture from percolated snowmelt and

heavy rainfall. Lack of springs in the application area suggest clinker is unlikely to contain significant quantities of water.

The coal aquifers are the most predictable shallow sources of water, and yield adequate water for domestic and livestock use. Even though inhabitants of the area near Decker rely heavily on groundwater for stock and domestic use, there are no water supply wells in the application area. However, an observation well in the Dietz 1 coal layer is located in section 8 and showed the depth of water to be 181 feet from the land surface in June, 1975 (VanVoast and Hedges, 1975).

Direction of groundwater flows are nearly identical for the Anderson-Dietz 1 and Dietz 2 coal layers in the application area. These coal aquifers are recharged by downward water movement and lateral movement from the west. Groundwater flows from the northwest toward the northern application areas (in sections 8 and 9), and it flows from the southwest toward the southern application area (in sections 17 and 20) (VanVoast and Hedges, 1975). Estimated yields for the West Decker area ranges from 30 to 45 gallons per minute for the Anderson-Dietz 1 coal seam, and 15 to 20 gallons per minute for the Dietz 2 coal seam (USGS/MDSL, 1977).

Table 2-11 contains water quality data from observation wells in the Decker area. The D-1 and D-2 terms refer to Dietz 1 and Dietz

2 coal seams. Wells numbered WR-6, WR-7, and WR-16 are closest to the application area, but not within it. The Dietz 1 and Dietz 2 coal aquifers have similar quality.

Dissolved solids concentrations range from 1,500 to 1,650 milligrams/liter. The coal yields soft and iron-free water that is less mineralized than the other aquifers and is suitable for domestic use. Alluvium yields water that is typically very hard and contains significant concentrations of calcium and magnesium.

TABLE 2-9 - Water Quality Values for Tongue River Upstream of Tongue River Reservoir October, 1965 - September, 1969.

Analysis	Range 1/	Mean 1/
Calcium	25-99	55
Magnesium	4.6-85	42.4
Sodium	7.4-110	35
Bicarbonate	103-321	224
Sulfate	8.5-530	190
Chloride	0-12	4.3
Flourine	.2-.6	.4
Nitrate	0-5.9	.9
Dissolved Solids	152-1,000	471
Specific Conductance	253-1,379 um/cm	690 um/cm
Hardness	110-580	311
Sodium Adsorption Ratio (SAR)	0.250-2.76	1.22

1/ All units in millgrams/liter unless indicated otherwise.

(USGS/MDSL, 1977)

TABLE 2-10

Water Quality Values for the Tongue River
and Tongue River Dam near Decker
October 1975 to September 1976

Property	No. of Analyses	Mean	Range	Units
Discharge (Q)	12		25-1510	ft^3/s
Specific conductance (at 25 deg. C)	12	706	330-945	umhos/cm
pH	12	8.2	7.9-8.5	units
Temperature	12	9.5	2.0-22.0	deg. C
Turbidity	12	5	2-10	JTU
Dissolved oxygen	12	100	92-103	percent
Biochemical oxygen demand	12	1.0	.4-1.8	mg/L
Calcium (Ca), dissolved	12	63	29-81	mg/L
Magnesium (Mg), dissolved	12	41	16-58	mg/L
Sodium (Na), dissolved	12	32	13-46	mg/L
Percent sodium	12	17	14-20	percent
Sodium-adsorption ratio	12	.8	.5-1.0	---
Potassium (K), dissolved	12	3.7	1.7-4.9	mg/L
Bicarbonate (HCO_3)	12	253	131-332	mg/L
Carbonate (CO_3)	12	1	0-7	mg/L
Sulfate (SO_4), dissolved	12	180	61-260	mg/L
Chloride (Cl), dissolved	12	3.3	1.1-4.6	mg/L
Fluoride (F), dissolved	12	.3	.1-.3	mg/L
Silica (SiO_2), dissolved	12	5.1	1.0-10	mg/L
Dissolved solids (calculated)	12	451	195-617	mg/L
Nitrite plus nitrate, total as N	12	.11	.00-.28	mg/L
Nitrogen, ammonia, total as N	12	.05	.00-.10	mg/L
Nitrogen, total organic as N	12	.67	.19-3.5	mg/L
Nitrogen, total kjeldahl as N	12	.72	.29-3.6	mg/L
Phosphorus, total as P	12	.04	.00-.07	mg/L
Suspended sediment	12	21	6-50	mg/L

	(Dissolved)		(Total)		
Property	No. of Analyses	Value or Range	No. of Analyses	Value or Range	Units
Aluminum	1	20	5	60-320	ug/L
Arsenic	1	1	5	0-1	ug/L
Beryllium	1	0	5	0-10	ug/L
Boron	12	40-150	---	---	ug/L
Cadmium	1	0	5	0-10	ug/L
Chromium	1	2	5	0-10	ug/L
Copper	1	2	5	0-10	ug/L
Iron	12	0-980	5	60-450	ug/L
Lead	1	1	5	100	ug/L
Lithium	1	20	5	10-40	ug/L
Manganese	1	10	5	50-90	ug/L
Mercury	1	.0	5	.0-.1	ug/L
Molybdenum	1	2	5	0-2	ug/L
Nickel	1	2	5	50-50	ug/L
Selenium	1	1	5	0-1	ug/L
Vanadium	1	1.6	---	---	ug/L
Zinc	1	2	5	0-20	ug/L

SOURCE: Knapton and McKinley 1977.

Neal McReynolds
8-585-5263
Helena

TABLE 2-11

Chemical Analyses of Waters from Observation Wells
In the Decker Area, Southeastern Montana

Observation-well location	Well number	Date of collection	Temperature (°C.)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Silica (SiO_2)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Iron (Fe)	Manganese (Mn)	Dissolved solids (calculated)	Hardness as $CaCO_3$ Carbonate	Hardness as $CaCO_3$ Noncarbonate	Sodium adsorption ratio	Specific conductance (micromhos at 25° C.)	pH (laboratory)
SMITH COAL																						
9S. 40E. 24AACD	WRE-17	2/27/75	11	8.3	3.2	710	6.1	1919	0	11.7	9.0	14	1.7	.4	.25	.00	2684	34	0	53.0	2690	8.2
D-1 UPPER COAL																						
9S. 40E. 13DCDD	WRE-11	2/19/75	13	9.1	3.1	650	5.2	1688	0	11.2	7.9	21	1.6	17.6	.00	.01	2414	35	0	47.5	2432	8.1
9S. 40E. 23BCCD	WRE-12	3/27/75	12	4.8	4.2	612	5.8	1498	0	27	4.9	11	2.2	4.1	.02	.00	2243	29	0	49.3	2274	8.8
9S. 40E. 24AACB	WRE-16	2/28/75	13	12	6.6	730	6.8	1567	0	317	8.5	22	1.4	.1	.01	.03	2672	57	0	41.9	2878	8.1
D-1 LOWER COAL																						
9S. 43E. 13DCCB	WRE-10	2/25/75	13	14	4.0	776	6.9	1969	46	1.5	9.0	23	1.4	.1	.01	.01	2851	50	0	47.6	2844	8.8
9S. 40E. 23BCCD$_2$	WRE-13	4/04/75	13	6.5	3.1	688	6.4	1684	86	2.0	8.0	9.2	2.3	.4	.00	.01	2496	29	0	55.6	2569	8.8
D-1 UPPER AND LOWER COALS COMBINED																						
9S. 40E. 16ABCD	WR-6	8/14/71	12	4.2	.7	435	5.9	1156	0	6.6	3.5	5.0	3.5	.0	.00	.00	1621	13	8	51.7	1585	8.2
D-2 COAL																						
9S. 40E. 16ABCD$_2$	WR-7	8/13/71	14	4.6	1.0	413	6.4	1087	0	3.8	3.5	5.1	4.3	.0	.00	.00	1529	15	0	45.5	1515	8.2
9S. 40E. 03DABA	WRN-10	4/02/75	12	74	57	448	13	698	0	787	15	13	2.0	.3	.00	.01	2108	420	0	9.5	2384	7.9
9S. 40E. 09AADD	WRN-15	4/30/75	11	5.2	2.3	415	4.2	1132	0	2.8	20	7.1	2.2	.5	.59	.03	1592	22	0	38.1	1595	8.0
9S. 40E. 12ABBA	WRE-5	3/25/75	9	131	174	806	17	707	0	2082	14	43	.9	.6	.00	.01	3976	580	470	10.9	4541	8.1
9S. 40E. 13DCBC	WRE-9	2/20/75	11	6.9	1.9	552	9.0	1317	39	63	21	24	3.0	2.1	.01	.01	2039	25	0	47.9	2185	8.7
9S. 40E. 23CBBA	WRE-14	2/26/75	14	7.4	1.7	652	6.7	1747	0	.3	11	20	1.7	.2	.21	.01	2448	25	0	56.1	2466	8.3
D-1 AND D-2 COALS COMBINED																						
9S. 40E. 18ABAD	WR-16	4/14/74	--	5.2	1.9	415	3.6	1123	0	5.5	11	7.5	3.3	4.7	.10	.00	1581	21	0	39.4	1640	7.9
9S. 40E. 29BBAC	WR-17	6/04/74	--	5.9	2.5	458	4.3	1105	58	3.7	9.2	25	3.3	.0	.00	.00	1675	25	0	39.9	1816	8.9
D-3 COAL																						
8S. 40E. 34DBDA	WRN-9	5/01/75	11	4.6	1.4	416	3.6	737	0	311	9.1	6.2	5.3	.3	.09	.00	1495	17	0	43.7	1726	8.3

Analyses by Montana Bureau of Mines and Geology Water Laboratory, Butte, Montana

Concentrations in milligrams per liter

SOURCE: Van Voast and Hedges 1975.

Vegetation

The plant communities present in the application area are representative of the Montana Mixed Prairie Association. Five natural vegetation types or communities are found within the West Extension application area (Map 2-2).

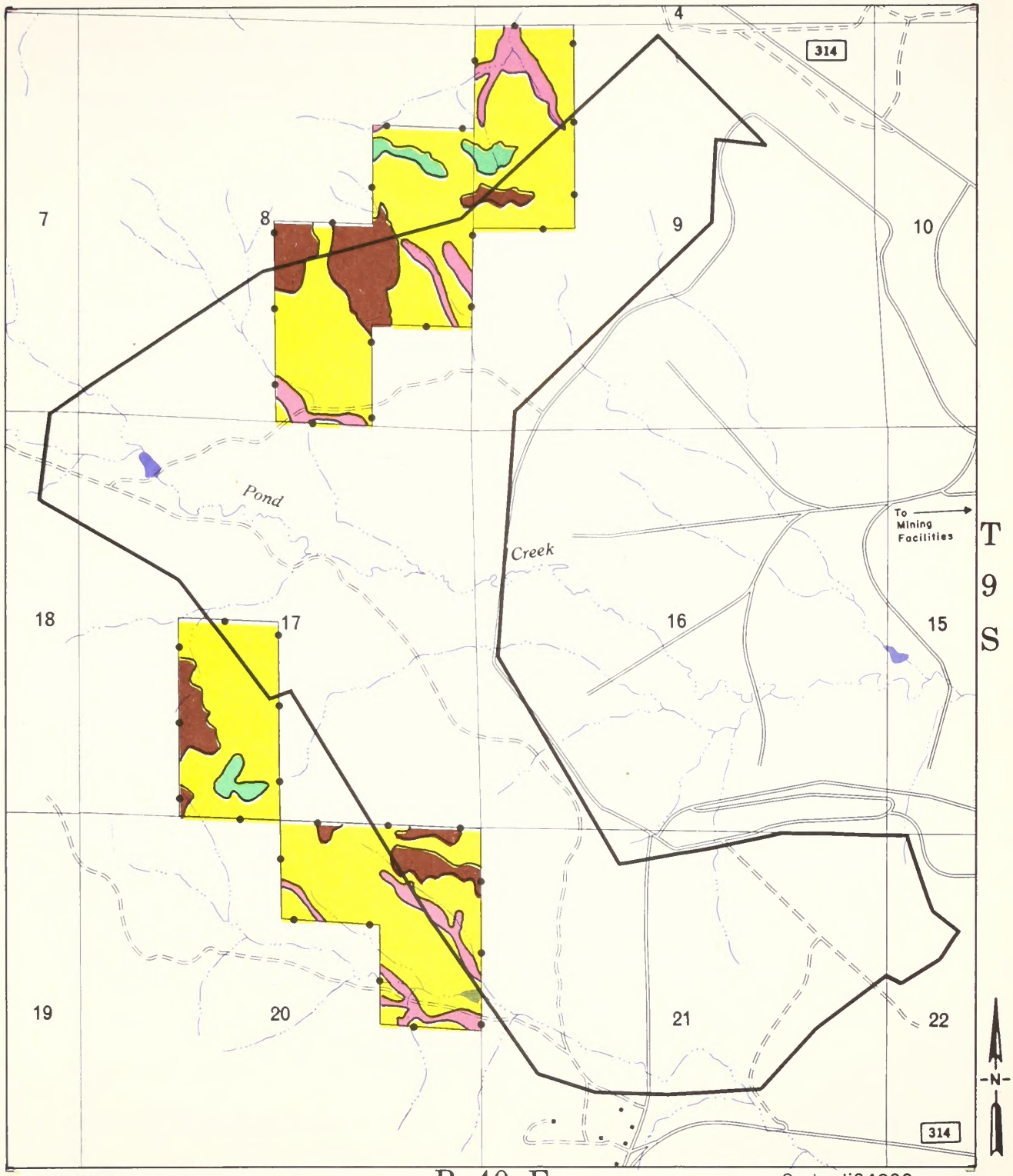
Juniper

The Rocky Mountain juniper (*Juniperus scopulorum*) community occupies approximately 12 acres within the application area and is primarily found on hillsides of high relief with coarse textured, rocky slopes. The understory is skunkbush sumac (*Rhus trilobata*), prickly currant (*Ribes lacustre*), and common chokecherry (*Prunus virginiana*). The understory grasses occur in discontinuous patches according to depth and texture of soil. In the deeper soils pockets on rocky slopes, the red threeawn (*Aristida longiseta*) and little bluestem (*Andropogon scoparius*) grow in scattered bunches. Predominate grasses found on level benches are bluebunch wheatgrass (*Agropyron spicatum*), prairie junegrass (*Koeleria cristata*), plains bluegrass (*Poa arida*), and needle-and-thread (*Stipa comata*).

Silver Sagebrush - Grass

The silver sagebrush (*Artemisia cana*) - grass community occupies approximately 34 acres within the application areas and is found on

MAP 2-2a
VEGETATION



LEGEND

- Mine Limits
- Lease Application M37604
- Big Sagebrush - Grass
- SEE TEXT Big Sagebrush - Mixed Shrub
- Rocky Mountain Juniper
- Silver Sagebrush - Grass
- Bluebunch Wheatgrass - Threadleaf Sedge

gentle relief. The range site is made up of moderately deep soils that have a surface layer of loam, silt loam, or silty clay loam. The understory is dominated by western wheatgrass (Agropyron smithii), bluebunch wheatgrass, needle-and-thread, prairie junegrass and blue grama (Bouteloua gracilis).

Disturbance such as overgrazing has permitted the invasion of annual grasses, Japanese brome (Bromus japonicus) and cheatgrass brome (Bromus tectorum).

Big Sagebrush - Grass

The big sagebrush (Artemisia tridentata) - grass community occupies approximately 337 acres within the application area and is found on dry hilltops and sidehills. The range site is made up of clay-type soils ranging from rather thick soils of clay and varying depths of layers of other materials. Coarse textured or shallow range sites are characterized by widely spaced growth of big sagebrush and fringed sagewort (Artemisia frigida). Bluebunch wheatgrass, prairie junegrass, needle-and-thread are the dominant grasses with occasional patches of plains bluegrass. As the soil becomes deeper in lower areas, the growth occurrence of big sagebrush increases. The understory grasses may include blue grama and Japanese brome. Under continuous heavy use sandberg bluegrass (Poa secunda), blue grama, bottlebrush squirreltail (Sitanion hystrix), plains prickly-pear (Opuntia polyacantha), curlycup gumweed (Grindelia squarrosa) will increase in total percentages in the total vegetation community.

Big Sagebrush - Mixed Shrub

The big sagebrush - mixed shrub community occupies less than one acre within the application area and is found on shale outcrop-type soils. This vegetation type is limited to steep sidehills. Big sagebrush, skunkbush sumac, western snowberry (*Symphoricarpos occidentalis*), and broom snakeweed (*Gutierrezia sarothrae*) occupy this type of site. This vegetation type was not included in the map because of the small area involved. It is located in the extreme southeast corner of the W½, NW¼, section 9, T.9S., R.40E.

Bluebunch Wheatgrass - Threadleaf Sedge

The bluebunch wheatgrass - threadleaf sedge (*Carex filifolia*) community occupies approximately 57 acres within the application area and is found on soils of various depths that have hard outcroppings of bedrock at different levels and are on steep, irregular slopes. Soil textures range from sandy loam to clay loam.

Other vegetation for this area consists of western wheatgrass, needle-and-thread, blue grama, green needlegrass (*Stipa viridula*), sideoats grama (*Bouteloua curtipendula*), prairie junegrass, Japanese brome, cheatgrass brome as well as other annual grasses and forbs.

Rare and Endangered Species

There are no known rare or endangered plant species or communities in or near the application area.

Noxious Species

Noxious plants are those which have been deemed undesirable due to their competition with other more valuable species such as food or cover. The one species in the Decker area which has been designated by the State of Montana as being noxious is:

Common Name	Scientific Name
Canada thistle	*Cirsium arvense*

It is not known if the above species actually occurs within the application area; however, Canada thistle is on the list of species known to exist in the Decker area.

Reclaimability

Climate is a primary determining factor in successfully rehabilitating disturbed land surface. It is responsible for the character of the land before the disturbance and would be responsible for what can be maintained there naturally after reclamation. One of the most important limiting factors in successful revegetation of

disturbed lands of the West is moisture. The seasonal distribution and total amount of precipitation will dictate reclamation success (NAS/NAE, 1974).

Reclamation research began during the summer of 1971 at the Decker Coal Company mining site near Decker, Montana. Montana State University research personnel, through the Montana Agricultural Experiment Station (MAES) in Bozeman, Montana, conducts the majority of the reclamation research studies that presently exist at Decker.

Most projects initiated at Decker prior to 1975 have now been completed by MAES researchers. However, observations of the reclamation research plots are being continued by MAES research staff. The following discussion will include the highlights of some of those reclamation research studies.

Results of single-species direct seeding trials suggested that the following perennial grass species are especially suitable for the Decker area: pubescent wheatgrass (*Agropyron trichophorum*), tall wheatgrass (*A. elongatum*), streambank wheatgrass (*A. riparium*), thickspike wheatgrass (*A. dasystachyum*), and crested wheatgrass (*A. cristatum*). Perennial grasses moderately successful were Siberian wheatgrass (*A. sibiricum*), smooth bromegrass (*Bromus inermis* var. Lincoln), Indian ricegrass (*Oryzopsis hymenoides*), and Nuttall alkaligrass (*Puccinellia airoides*) (DePuit and Dollhopf, 1978). Two alfalfa varieties (*Medicago sativa* var. Ladak and Ranger) and

yellow sweetclover (Melilotus officinalis) were legume species moderately well established by 1975. The introduced half-shrub prostrate summercypress (Kochia prostrata) and native shrub greasewood (Sarcobatus vermiculatus) were well established from seed by 1975, while Nuttall saltbush (Atriplex nuttallii) was moderately established. Direct shrub species seeding into a rocky, scoria-filled seedbed by 1975 had yielded productive stands of four-wing saltbush (Atriplex canescens), greasewood and black sagebrush (Artemisia arbuscula nova).

A drill seeding trial in 1973 using gouging as a surface manipulation treatment showed no apparent benefit over the non-gouged control. The gouging treatment was inferior to the control in terms of lower seeded species biomass (double for the control) and higher weed biomass. Although native species comprised over 25% (by weight) of the perennial species seeded, a 1975 vegetation sampling showed the trial area dominated by weeds and seeded naturalized introduced species.

Tubeling transplantation method for shrub establishment on mine spoils was initiated by MAES (1973) was initially moderately successful for caragana (Caragana arborescens), snowberry (Symphoricarpos occidentalis), fringed sagewort (Artemisia frigida) and skunkbrush (three-leaf) sumac (Rhus trilobata). However, by 1975 complete seedling mortality for all transplanted shrubs was evident.

This mortality was primarily attributed to excessive perennial grass competition and browsing by deer rather than to deficiencies of the tubeling method.

Also, litter accumulation was substantial, which would show that some form of organic matter is being added to the soil.

Under proper management of the rehabilitated surface, the vegetation should be as good or better as the vegetation prior to disturbance.

Animals

Domestic

Livestock grazing has been a common practice on the private and federal surface within the application area. Approximately 280 acres of private and 160 acres of federal native range are available for livestock use in sections 8, 9, 17 and 20.

Sections 8 and 9 have 120 acres of private range and 120 acres of BLM range having an estimated average carrying capacity of 5.56 acres per Animal Unit (AU) or approximately 44 Animal Unit Months (AUM's). Decker Coal Company controls the private and BLM grazing in sections 8 and 9 within the application area. Presently, Decker

Coal Company has cancelled leases for private surface grazing and has no livestock on BLM range within the application area.

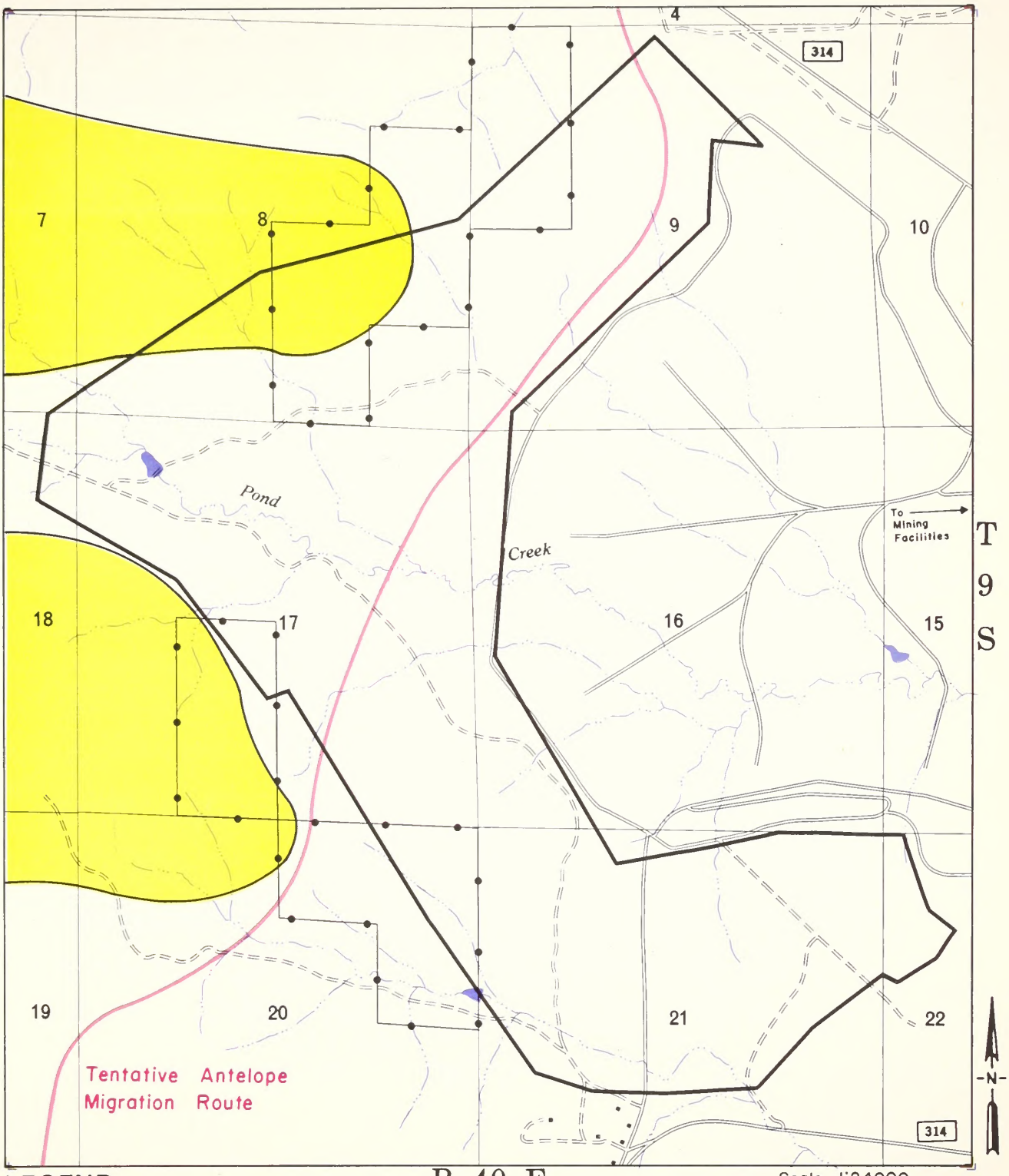
Sections 17 and 20 have 160 acres of private range owned by Consolidation Coal Company having an estimated average carrying capacity of 10 acres per AU or 16 AUM's available for grazing purposes. The 40 acres of BLM surface in section 20 has an estimated average carrying capacity of 4 AUM's and is leased to Norsworthy and Reger Incorporated for grazing purposes. The area in sections 17 and 20 within the lease application area is not being grazed at the present time (private or federal). However, this area is a partial of Consolidation Coal Company's ranching operation for late fall, winter and early spring grazing operation for cattle.

The total AUM's (private and federal) in sections 8, 9, 17 and 20 are 64 within the application area (440 acres).

Wildlife

Two crucial mule deer (*Odecoileus hemionus*) winter ranges have been identified in portions (117 acres) of the steep slopes of the lease application areas (see Map 2-3). Mule deer utilizing these areas are migratory in nature and come from as far as Kirby to the north and the Wolf Mountains to the west (Biggens, personal communication, 1979). Mule deer use in the past severe winters has been confined to the southwest slopes at elevations of 3,600 feet MSL where winds

MAP 2-3
WILDLIFE



LEGEND

Mine Limits

Lease Application M37604

Mule Deer Winter Range

and sunshine kept the slopes bare. Jackson (personal communication, 1979) estimated 25 to 50 mule deer wintering in sections 8, 9, 17 and 20 over the past four years. Use of the application areas has been low due to the lack of suitable slope aspects and available browse species. Resident herds in the Decker area average .5 mule deer per square mile with the West Decker herd exhibiting more migratory tendencies than the East Decker herd (Biggens, personal communication, 1979).

Antelope (Antilocapra americana) are present yearlong in the Decker area. No major use areas exist in the lease application areas, but the large basin in the north half of section 17 between the areas is summer range for up to a dozen animals. This same area has been tentatively identified as a winter migration route for up to 200 animals through the base application area for antelope moving between the Spring Creek and Squirrel Creek drainages (Amstrup, personal communication, 1979).

No raptor nesting has been identified on the lease application areas. Use of the areas for foraging flights by golden eagles (Aquila chrysaetos) have been identified along the ridge lines where thermal updrafts are present in the western part of the application area by the golden eagles which are nesting one and one-half miles to the west (McEneaney, personal communication, 1979).

Use by other wildlife of the lease application area is low. There are no known sharp-tailed grouse (Pedioecetes phasianellus) or sage grouse (Centrocercus urophasianus) display grounds and no nesting by either species has been documented. Non-game species are numerous and have been identified by Decker Coal Company (1975). Use of the application area by these species is low as habitat diversity is low.

One endangered species, the bald eagle (Haliaeetus leucocephalus) has been identified in the Decker area. Bald eagles frequent the Tongue River and Tongue River Reservoir on a migratory basis, but no use has been identified on the lease application areas.

Other sensitive species as identified by the State of Montana (Flath, 1979) which occur in the Decker area are: Goshawk (Accipiter gentilis), osprey (Pandion halieetus), Swainson's hawk (Buteo swainsoni), ferruginous hawk (Buteo regalis), merlin (Falco columbarius), prairie falcon (Falco mexicanus), upland sandpiper (Bartramia longicauda), long-eared owl (Asio otus), eastern bluebird (Sialia sialis), mountain bluebird (Sialia currucoides), clay-colored sparrow (Spizella pallida), Brewer's sparrow (Spizella) breweri), long-legged bat (Myotis volans), big-eared bat (Plecotus townsendii), and the plains hognose snake (Heterodon nasicus). Actual use of the lease application area by these species is low to non-existent, depending on the individual species discreet habitat requirements.

There is no legally designated critical habitat for federal or state threatened, endangered animal species; no active bald or golden eagle nests, roosts, concentration areas, or active falcon cliff nesting sites within ¼ mile of the lease application area. There are no designated federal lands which are high priority habitat for migratory bird species of high federal interest or for fish and wildlife of high state interest in the application area.

Recreation

There are no developed recreation facilities within the application area. It is conceivable, however, that some use may occur related to hunting and other dispersed forms of recreation. This use would be limited, however, due to the private ownership of the area.

No specific data is available to determine actual use of the recreation resources in this area.

Cultural Resources

Two intensive inventories have been conducted in the lease application areas to locate, record and evaluate cultural properties (Fredlund, 1972; Hoyt, 1977). Designed to find all surface manifestation of past human activity within the application areas, these surveys located a single prehistoric property, the Buzzard Point Site, 24BH1004. No historic sites were recorded.

The Buzzard Point Site is a small lithic scatter functionally characterized as a "lookout". During the initial investigation of 24BH1004, cultural materials were collected, but no temporally diagnostic artifacts were found.

Site 24BH1004 does not contain significant cultural data beyond that which was recovered in the first study (Fredlund, 1971:16; Hoyt, 1977:3; and Letter from L. Fredlund to M. Hoyt, 1977). Pursuant to 36 CFR 800.4, the BLM has applied the National Register criteria to the site in consultation with the Montana State Historic Preservation Officer and finds that the Buzzard Point Site does not meet the eligibility criteria for the Register (telephone consultation, June 1, 1979).

The inventories have identified a prehistoric fortified camp which may be eligible for the National Register. the camp is located within ½ mile of the lease application area in Section 8, T.9S., R.40E. The Cox Fortification Site, 24BH1003, contains stone circles, lithic artifacts and hearths. It may have buried cultural deposits (Hoyt, 1977:3). 24BH1003 is in private ownership.

Aesthetics

When viewed by itself, the environment of only the application area can be described as rolling benchland covered by a sagebrush-grass

complex interspersed with three small areas of juniper trees. This low, rolling landscape permits a view of several miles in each direction.

The generally muted color tones of gray sagebrush, light green grass, tan soil and dark green patches of juniper combine to present a landscape common to much of southeastern Montana.

Mining on adjacent lands has had a major influence on the aesthetics of the application area. The existing West Decker mine is operating within about 300 yards of the area considered. With the existing mining operations are roads, the open pit, powerlines, buildings, noise from heavy equipment operating, unreclaimed spoil piles and dust. These factors all combine to substantially reduce aesthetic quality of the application area.

Socio-Economics

Current Socio-Economic Conditions, Sheridan County, Wyoming

90% of southern Big Horn County, Montana, coal miners choose to live in Sheridan County, Wyoming, so it is necessary to discuss baseline conditions in both Big Horn and Sheridan Counties.

Sheridan County's 1979 population forecast estimate of 22,500 people (Wyoming Employment and Population Forecast Report, 1978)

represents a 26% gain over the 1970 census count of 17,852 people. One particular economic interpretation (economic base analysis) assumes that such population changes result from changing job opportunities. Using this economic interpretation, it appears that 80% of the population change from 1970 to 1979 (3,700 of the 4,600 to 4,700 people) was the result of the increased coal mining employment.

The population centers most affected by coal development (those cited most frequently as preferred by coal miners) were Sheridan (13,200 residents in 1976), Dayton (550 people in 1976), and Ranchester (420 living there in 1976).

Partly because the mining-induced population located in Sheridan County while the taxable property of the industrial activity (coal mining) was in Big Horn County, Sheridan County had to tax itself to its legal limit on property tax (12 mills as set by the Wyoming Constitution) and on sales taxes (a maximum of 4¢ on the dollar). The City of Sheridan also had to tax itself to its legal limit (8 mills) plus bond itself and tax to pay off those bonds at 2.935 mills. The city had to go to debt financing to meet increased demand for services (personal communication, staff personnel, Wyoming Taxpayers Association). Obviously, Sheridan County's options in dealing with additional growth are very limited unless unforecasted increases in the tax base develop.

In addition to the fiscal effects of rapid population change, community and governmental reorganization resulted from the population increase (Northern Powder River Basin Regional Environmental Statement, 1979). These changes included:

(1) Redistribution of power to affect decisions and alter the distribution of rewards;

(2) Differences in the availability and variety of goods and services;

(3) Changing perceptions of the pace and quality of life; and,

(4) Changing capability of and demand on private and public sector services such as health delivery, security services, schools, recreation, administration and public works.

Depending on the cultural beliefs and/or the economic gain or loss experienced, these changes were either perceived as beneficial or harmful by those interviewed and cited in the Northern Powder River Basin Environmental Statement.

Although mining contributed significantly to these changes, it is a relatively minor economic activity in the county. Even with the

inclusion of those residents who have their primary income from mining in Big Horn County, the percentage of Sheridan County residents who depend on mining is only about 10%. Government in Sheridan County employs over 22% of the work force, trade over 20%, services over 14% and agriculture employs 9% (nearly as many as mining).

Big Horn County, General

Because most miners preferred to live in Sheridan County, Big Horn County experienced continuing net outmigration in spite of greatly increased economic activity (Northern Powder River Basin Regional Statement, 1979). The 1977 population estimate of 10,700 (U.S. Bureau of the Census, P-26 Series) was about 6% above the 1970 census count of 10,057. The county thereby exceeded its previous historical peak in population (10,419 in 1940) by less than 3%.

Little reorganization of the county was necessitated by this slight increase in population above the levels previously experienced in the county (Northern Powder River Regional Environmental Statement, 1979). Those fiscal changes that did come were primarily beneficial due to the increasing tax base at the mine site with relatively stable demands for services. Perceived negative effects included increased stress among those residents (primarily ranchers) who saw mining as a threat to their way of life.

Big Horn County, Native Americans

The Decker coal field is flanked by the Northern Cheyenne to the north and the Crow peoples to the west. The Reservation Crow number about 4,400 people with about another 500 Crow in Hardin, the county seat (Fighter, 1977). The Northern Cheyenne Reservation, located in both Big Horn and Rosebud Counties is thought to have about 2,600 Native Americans in residence (Rho Corporation, 1977). Of the Northern Cheyenne, approximately 400-450 live in Busby in Big Horn County. Adding these individuals to the Crow population, it is apparent that nearly 50% of Big Horn County's population is Native American. The Native Americans, although seeking work as actively as white residents, are greatly underrepresented in both the number and kinds of jobs they are allowed to hold (Studer, 1977; Fighter, 1977). This condition of not being able to secure good jobs in proportion to their representation in the population existed prior to mining. While mining has done nothing to enhance the condition of the Native Peoples, there is no evidence that it has created significantly new problems for them.

Public Law 95-341, the Native American Religious Freedoms Act, requires the Bureau of Land Management to take special actions "to ensure that the exercise of religious freedoms of the Native Americans is not infringed upon. Should sacred sites be discovered, then the Bureau of Land Management will follow the procedures set forth pursuant to the Act. To date, none have been located.

Chapter 3 - Environmental Impacts

Chapter 3

SUMMARY OF IMPACTS

The following is a table summarizing the major impacts from the proposed action. The mitigations listed are, except for the additional workers, those required by state and/or federal laws.

Impacts	Mitigation
Loss of the $Dietz_2$ coal as a recoverable resource	non-mitigable
440 acres of surface (vegetative) disturbance	successful reclamation
360 acres of soil disturbance	successful reclamation
loss of 360 acres of undeveloped entisols	non-mitigable
temporary drainage diversion	successful reclamation
loss of Anderson-$Dietz_1$ coal aquifer	non-mitigable
an additional 26 mine workers	necessary facilities and social services
loss of mule deer habitat	reseed to a grass and shrub community

ENVIRONMENTAL IMPACTS

Air Quality

The major air pollution emissions expected from mining the application area are the same as those from continued mining of the existing leases (Tables 3-1, 3-2, and 3-3). Because of the removal of an additional 25.2 million tons of coal, the impacts can be expected to extend an additional 3 years.

TABLE 3-1[1/] -- Estimated uncontrolled particulate emissions for the surface mining of coal at the North Extension Mine (modified after VTN Colorado, 1975b)

Mining Activity	Estimated fugitive dust or particulates (tons/year)
Topsoil removal	3
Overburden removal	200
Coal extraction	57
Wind erosion of spoil piles	43
Overburden recontouring	75
Topsoil replacement	3
Haulage traffic	340
Coal crushing	120
Coal handling and conveying	690
TOTAL	1,531

TABLE 3-2[1/] -- Estimated diesel-exhaust emissions from mine vehicles and equipment at the North Extension Mine (modified after VTN Colorado, 1975b

Pollutant	Diesel truck emissions (tons/year)	Total equipment emissions (tons/year)
Particulates	0.1	0.2
Carbon monoxide	1.4	2.7
Hydrocarbons	.2	.5
Nitrogen oxides	2.3	4.6
Sulfur oxides	.2	.3
TOTAL	4.2	8.3

1/ Final Environmental Statement for East Decker and North Extension Mines, p. 423.

TABLE 3-3[1/] -- Estimated train emissions resulting from coal transport at the North Extension Mine (modified after VTN Colorado 1975b)

Pollutant	Estimated emissions (tons/year)
Particulates	3.2
Carbon monoxide	17.0
Hydrocarbons	12.0
Nitrogen dioxide	48.0
Sulfur dioxide	7.4
TOTAL	87.6

Topography

The "approximate original contour" requirements as set forth in state and federal regulations will result in an averaging of the existing topography.

Geology

The proposed action will make available approximately 25.2 million tons of coal. Decker Coal Company anticipates the removal of 10.9 million tons from the existing lease that would otherwise be by-passed because of highwall reduction requirements and 14.3 million tons that underlie the new application area.

Mining the Anderson-Dietz$_1$ bed, but not the Dietz$_2$, will result in committing the D_2 coal to non-use.

1/ Final Environmental Statement for East Decker and North Extension Mines, p. 423.

Mining of the tract may damage or destroy any paleontologic resources that may exist on the site.

Soils

Reconstructed soils would not duplicate the existing soils in the application area. The unique set of biotical, chemical and physical properties that characterize a given kind of soil-plant system would be destroyed. However, over time a completely new and unique soil plant system would replace the original.

Soil structure and porosity would be altered. The original arrangement of pores and cracks, which determine the distribution of percolating water, roots and air in the soil profile, would be destroyed. A negative change, which could lead to reduced infiltration and increased runoff and erosion, could occur if the soil material is salvaged and worked when wet (1/3 to 10 atmospheres of soil water tension). Heavy, plastic clays that are found in the B Horizons of nearly 75% of the area would be the most sensitive to this condition.

Natural soil fertility would be reduced since organic matter, soil microorganisms, and the mineral fraction would be disturbed and mixed, causing a disruption of the present nutrient cycle.

Chemical properties would also be altered because of soil mixing. Two properties most likely to change would be an increase in calcium carbonate ($CaCO_3$) and pH, within the top 12 inches of the soil profile. A pH range of 7.0 to 8.4 (slightly alkaline to moderately alkaline soil), would most likely be the result of soil mixing. These increases would result in a more variable pH and calcium carbonate profile, although increases would not be great enough to significantly impact water quality or establishment of vegetation.

Soil depth would be impacted. Existing soils in the application area have different depths of soil reconstruction material ranging from 0 to 60 inches. This depth and the quality of existing soils would be reduced in some soil series and increased in others. A, B, and C horizons are the letter designations of soil layers by increasing depth and have no direct bearing on the value of that layer as a soil reconstruction material. Removal depth would be in response to these designations. However, when these soils are respread over the regraded spoils, there could be a uniform depth of about 2 inches of material rated good for topsoil in the lease application areas in sections 8 and 9 and about 2 inches of material rated good for topsoil in the lease application areas in sections 17 and 20.

This uniform depth would be an improvement on approximately 90% of the application area previously characterized by very thin,

rocky soils. However, it would impair about 10% of the area that originally had thicker soil layers.

Soils in the application area could become more susceptible to wind and water erosion during the time span of stripping the topsoil until it is replaced and revegetated. This period may range from 10 to 15 years depending on mining and reclamation sequence. Soil Conservation Service soil series descriptions and interpretations identify Midway soils as having high susceptibility to water erosion. Midway soils occur on about 110 acres of the application area.

Rock and shale outcrop areas also have high erosion rates. In these worst case situations, high erosion rates combined with long steep slopes could yield as much as 118 tons per acre annually (see Table 3-4 and 3-5). The effect of this impact would be the loss of a small amount of potentially usable soil reconstruction material.

During stockpiling and spreading of topsoil material, uneven compaction could result in too much compaction causing reduction of pore space, leaving the soil impervious, or too little compaction that could leave the soil too porous and thus more droughty and more erodible.

TABLE 3-4

Water Erosion Soil Losses From Bare Ground
(tons per acre per year)

Soil Textures	100-Foot Slope Length (per acre)			300-Foot Slope Length (per acre)		
	2%	10%	16%	2%	10%	16%
Sandy	2	12	24	2	20	41
Silty	3	20	40	4	34	64
Clayey	4	26	53	5	44	82
Rocky Shaly Subsoil	5	34	70	9	59	118

SOURCE: Pointer 1977, from data developed by Alaska Natural Gas Transportation System, Final Environmental Impact Statement 1976; USDA, Agriculture Research Service 1977; and Soil Conservation Service using the Universal Soil Loss Equation.

TABLE 3-5

Potential Wind Erosion Soil Losses From Bare Ground
(tons per acre per year)

Soil Textures	Distance Exposed to Wind (Feet)					
	50	100	200	500	1,000	10,000
Sandy	5.0-18.0	11.0-27.0	15.5-24.5	23.0-44.5	29.0-51.0	34.5-53.5
Silty	0.5	1.5	3.0	6.0	9.6	15.0
Clayey	2.5	5.7	10.0	15.5	19.5	26.0

SOURCE: Pointer 1977, from Alaska Natural Gas Transportation System, Final Environmental Statement 1976.

Hydrology

Surface Water

Drainage patterns would be disrupted during mining. Retention reservoirs would be constructed upstream of the mining operations to keep surface runoff from entering the pits. The southern drainage ditch would be eliminated and the northern drainage ditch would be relocated twice so that the area it is on can be mined. Water from the retention reservoirs would be pumped or drained into the relocated northern drainage ditch which empties into Pearson Creek.

The diversion of more Pond Creek watershed runoff into the northern drainage ditch would cause Decker Coal Company to increase the channel capacity of the ditch to accomodate a peak flow of 898 cubic feet per second (cfs) as opposed to an existing 342 cfs flow. Subsequently, the flow to Pearson Creek would be temporarily increased and the flow to Pond Creek decreased. Since both creeks only flow seasonally, no fish would be harmed by the variations in flows. Also, the diverted water would still flow into the Tongue River Reservoir.

Some additional channel erosion would occur in Pearson Creek downstream of the confluence of the diversion ditch due to the increase in flow. Part of any increase in channel erosion to Pearson Creek would be offset by reduced flow and subsequent reduced channel

erosion of Pond Creek. The additional flow and channel erosion to Pearson Creek would occur with the current mining in the West Pit. Therefore, the proposed mining of the application areas would have no additional impact.

Mining of the application areas would call for relocation of the existing diversion ditch which could result in the channel erosion of fine particles. However, federal regulations state that diversions must remain stable and prevent an increase in suspended solids in the runoff outside the mine area. Therefore, no significant increase in sediment would be introduced into the Tongue River Reservoir by the ditch diversion.

Any water existing in the mining operations would either be evaporated or pumped into existing settling ponds to the east of the application area. The mining operations would have little effect on the surface water budget since only 160 acres would be mined resulting in a maximum average annual loss of 4 to 5 acre-feet (based on a 0.3 and 0.4 inch runoff rate) of surface runoff. Effluent from the settling ponds is carefully monitored before entering the Pike spawning marsh, after which bioanalyses are done. Therefore, no significant effect on the water quality of Tongue River Reservoir or Tongue River would occur by mining operations.

After mining, drainages will be re-established to pre-mine conditions. Stream gradients should be about the same, but overland

flow slope would be slightly reduced to the maximum slope for reclaimed land of 20 percent specified by the state. Less than 10 percent of the land would be affected, so the effect on runoff would be insignificant. Surface water quality should be as good if not better than pre-mined conditions due to the reduced slope and more homogenous vegetation.

Groundwater

The Anderson-Dietz 1 coal aquifer would be eliminated during mining of the application area. Van Voast and Hedges (1975) reported that after three years of mining at Decker, water levels in monitored Anderson-Dietz 1 coal aquifer wells very close to the mine have dropped almost 40 feet. Water levels in other wells within 1½ miles west of the mine have declined 10 feet or more.

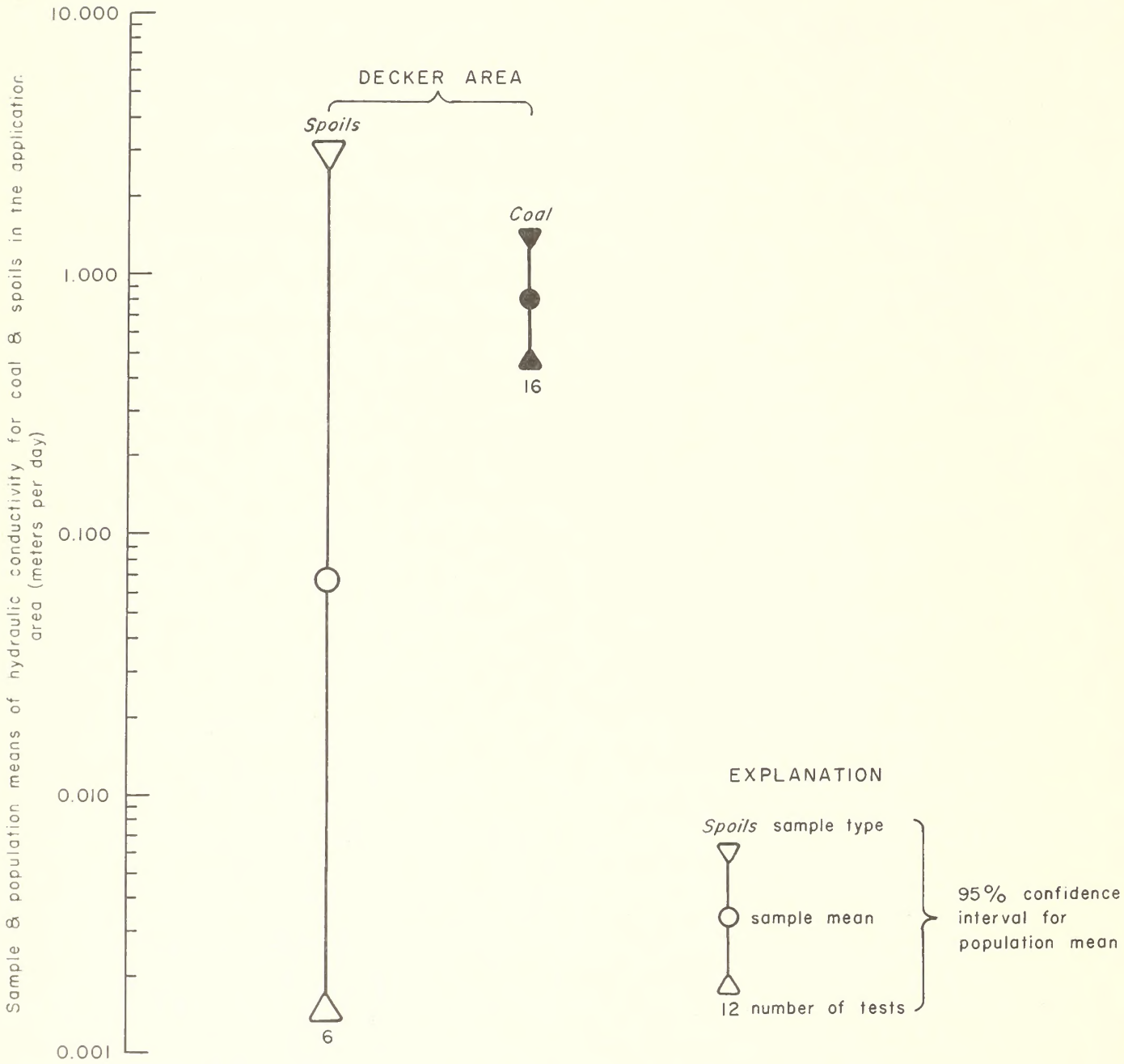
Van Voast and Hedges (1975) also observed that the water levels in wells tapping the Dietz 2 coal layer dropped, even though the aquifer has not been directly disturbed. They attributed the declines to upward leakage to the Dietz 1 layer. After the first two years of mining, they found that water level reductions for both the Anderson-Dietz 1 and Dietz 2 seams began to stabilize, indicating that the groundwater system started to approach a new equilibrium. However, full stabilization of water levels would not be attained during mining, but future water level declines would not be as severe as those that have already occurred.

Mining in the application areas would not have significant effect on well levels in itself, because only about 5 percent of the total West Decker coal excavation would be in the application area. However, mining in the area would have some impact. According to Van Voast and Hedges (1975), water levels in West Decker wells would show significant lowering due to mining only in section 21, T.9S., R.40E. (immediately south of the proposed mining operations). Section 21 contains two unused wells, two domestic wells, one commercial well, and one stock well. Also, water levels would be lowered some in other wells, but probably not enough to reduce the yields of the wells. Mining in the application areas should not be directly affected by or affect the reservoir since it is over two miles away from it.

Groundwater intercepted by the mine cut would be pumped into settling ponds. As with surface runoff, the quality of such waters would be carefully monitored before reaching a major body.

Van Voast, et. al. (1978) indicates what happens to the groundwater regime after mining. Their evidence suggests that the most permeable portions of mine spoils are along the mine floor once occupied by the Anderson-Dietz 1 coal layer where coarse materials such as wasted coal and boulders have accumulated. The wells closest to the application areas are in section 9. Two wells there showed the depth of water to be about 100 feet in April 1978 (over two years since reclamation). This level is generally closer to the surface than the nearby Anderson-Dietz 1 coal aquifer levels of 1975.

FIGURE 3-1
HYDRAULIC CONDUCTIVITY



Source: Van Voast, et al, 1972.

Measurements and estimates of aquifer characteristics indicate that the occurrence and flow of groundwater in mine spoils would not be significantly different from pre-mined conditions. However, groundwater flow rates are generally lower for the spoil material than for coal. A comparison of the spoil and coal hydraulic conductives, the rates that groundwater moves into and through geologic materials, is presented in Figure 3-1. The average hydraulic conductives for the spoils are less than that for the coal. Comparisons of well water yields from these materials could generally be considered proportioned to these flow rates.

Chemical quality of the spoil water would be different than pre-mined aquifers in concentrations. Van Voast and Hedges (1975) predict that post-mined groundwater will have dissolved solids concentrations of 6,000 milligrams per liter (mg/l) over the entire West Decker area. This concentration is far above the present concentration of waters near the application area (less than 2,000 mg/l), but still would be acceptable for livestock, but not domestic or irrigation use. The predominations in the spoil water have been found to be bicarbonate and sodium (Van Voast, et. al., 1978). These are the primary ions of the pre-mined well water.

Vegetation

The most dramatic and critical impact on the existing vegetation is a result of topsoil removal and construction of haul roads. Vegetative species (refer to Chapter 2, Vegetation) would be totally

eliminated on areas stripped of topsoil. The effects of "associated disturbances" on vegetation would range from total destruction in some areas to minor disturbances in others. This would result in a loss of forage for domestic livestock (64 AUM's) and wildlife as well as wildlife habitat.

Vegetation diversity may be lost for approximately 3 to 5 years after reclaimed lands have been seeded. On revegetated lands within the application area, soil depth and other soil qualities would be more uniform than those which existed prior to mining. This would result in a more uniform vegetative cover on the application area.

Animals

Domestic

Mining of the application area would eliminate opportunities for domestic livestock to occupy the private surface and utilize the available forage. Leasing and subsequent mining of the application area would result in a loss of 64 AUM's annually until successful reclamation has been accomplished. This loss would be insignificant by itself. However, added to the existing loss of 462 AUM's from the adjacent approved mining area, this would result in approximately 12% of the total loss of AUM's committed to the mining operations.

Recreation

Mining of the proposed lease area would not significantly add to impacts associated with current mining of existing leases within the Decker area.

Aesthetics

Mining of the application area would increase the magnitude of aesthetic impacts occurring at the existing mine. Additional vegetation would be destroyed and would remain absent until reclamation was accomplished.

Social and Economic Conditions with the Proposed Action

Sheridan County

About 26 additional employees would be needed to strip off the top 60 feet of overburden (to allow efficient dragline operation) over the relatively deep federal coal (personal communication, Dave Jennings, Decker Coal Company). If all these workers were hired new, then a population change of about 110 people might result (counting miners, their families and the workers who would serve them). Allocated along existing residential preference lines, this population change might mean a ½ of 1% change in Sheridan's population (80 people), a 1½% population change in Dayton, and 2%

in Ranchester (9 more people in each of the two smaller communities). Although Sheridan County is facing severe fiscal constraints (see Chapter 2, Current Social and Economic Conditions), it is not likely that population changes of this magnitude would cause any significant social or economic problems. The change in community size will be so small as to be unnoticeable.

Big Horn County

Agriculture values of the land that might be interrupted by mining were discussed in the Vegetation section of this chapter. The 64 animal unit months described in that section are used about 8 months out of the year -- supporting about 8 head of cattle. Using 1978 prices of 70¢ per pound and 700 pounds finished weight per post sales receipts loss could be $3920.00. Of the 64 AUM's, the 16 AUM's on federal lands at $1.89, represents an income loss to BLM of $30.24.

Similarly, utilization of the site for wildlife and recreation was determined to be either nonexistent or very low (see Wildlife and Recreation section of this chapter). No significant off-site impacts to vegetation, soils, wildlife, agriculture or recreation were identified by the natural resource specialists. It appears there are no natural resource impacts that have significant social or economic values associated with them.

The 2-3 miners expected to locate in Big Horn County might generate additional employment and population of about 15 people or less than 2/10 of 1% of the 1977 population. This was not considered to be significant in terms of its impact on the social system or government and public serving private and public entities of Big Horn County.

Land Use

An immediate impact of mining is the removal of the land from livestock grazing and wildlife useage. The impact of this change is measured by the resultant changes in the physical character and properties of the land involved. Such changes are covered under the above environmental component headings.

These impacts will continue until successful reclamation has occurred and are considered short term.

Wildlife

Existing wildlife habitat (see Vegetation, Chapter II) would be destroyed by mining and would eliminate the majority of use by wildlife until the grassland and shrub-grassland communities would be reclaimed. This is expected to take 10 to 15 years to accomplish from the onset of mining activity on the application area. Mule deer densities in sections 8, 9, 17 and 20 average from 6 to 13

deer per section during the winter months. Mining and associated surface disturbances of the application area will displace 1 to 5 deer on their traditional wintering grounds. In addition, approximately 120 acres of steep slopes characteristic of mule deer wintering areas will be lost in highwall reduction. This is not a substantial loss as these slopes are the easternmost extension of the wintering area, but any further mining to the west will affect up to 200 wintering mule deer. Reduction of these steep slopes would probably alter the hunting territory of the resident golden eagle pair by changing the thermal updraft air pattern common to steep terrain. Extension of the mine to the west will block or alter the antelope migration pattern for up to 200 animals between Spring Creek and Squirrel Creek. Additional winter mortality could occur if the antelope are forced into more broken terrain where movements are impeded. Expansion of the mine area would increase the sphere of human-wildlife interaction and negatively affect the wildlife populations. Mortality of deer through vehicle accidents and poaching has already been proven to be a definite problem. The impacts on deer, eagles and antelope would be long term, 20 to 25 years, and may extend beyond the mining and reclamation phase of the project.

Cultural Resources

Inventories have demonstrated that no National Register properties with surface manifestations are located in the lease application

areas. However, it is remotely possible that buried cultural properties with no surface indications remain yet undiscovered. Mining would destroy any such buried sites.

Outside of the lease application areas, sites may be disturbed by indirect mining impacts. However, the nature and magnitude of these impacts, if present, will not be known until a final mine plan has been completed.

Chapter 4 - Mitigating Measures

Chapter 4

MITIGATING & ENHANCING MEASURES

Should leasing and development proceed as proposed, all existing federal and state laws and regulations pertaining to coal strip mining and its associated effects on the environment would apply. Any leasing action which may take place would have the opportunity to include necessary special stipulations to minimize the impacts on the existing environment. The following mitigating measures could be applied in addition to existing laws and regulations to minimize or eliminate the impacts identified in Chapter 3. As these would be mine plan considerations they can best be handled prior to issuance of the mining permit by the Office of Surface Mining in consultation with the Bureau of Land Management.

Geology

Before $Dietz_2$ coal is committed to non-use, the U.S. Geological Survey should prepare a report to evaluate the feasibility of mining D_2 coal.

If significant paleontologic resources should be unearthed because of mining activity, a salvage plan should be devised and made a part of the mining/reclamation plan.

Soils

Soil materials should be salvaged in lifts according to their topsoil suitability rating (See Tables 2-5, 2-6, 2-7, & 2-8). Subsequent stockpiling and respreading should keep these lifts separated from one another. The soil should be salvaged and worked during dry periods (soil moisture 10+ atmospheres of soil water tension). These mitigating measures would reduce impacts to soil structure, porosity, chemical properties, nutrients, and soil compaction.

Hydrology

The loss of the Anderson-Dietz 1 aquifer as a water source for future development could be mitigated by completing wells below the removed Anderson-Dietz 1 layer as the need for such water develops.

Animals

Domestic

Current state policy allows grazing in 3-5 years providing there is adequate vegetation present to allow proper range management on reclaimed land. This should be considered to off-set the loss of AUM's.

Wildlife

Revegetation of the application area would initially re-establish a grassland vegetative cover. Inclusion of selected forbs and shrubs in the replanting mixture would provide an early habitat diversity for wildlife by increasing the vegetative diversity of the area. Both game and nongame species would benefit from these plantings. An example of some shrubs and forbs which would yield high wildlife benefits are: Big sage (*Artemisia tridentata*), silver sage (*Artemisia cana*), fringed sagewort (*Artemisia frigida*), skunkbrush (*Rhus trilobata*), woods rose (*Rosa woodsii*), silverleaf scurfpea (*Psoralea argophylla*), winterfat (*Ceretoides lantana*), common salsify (*Tragapon dubious*), eriogonum (*Eriogonum spp.*), hairy goldenaster (*Chrysopis villosa*), western ragweed (*Ambrosia psilostachya*), and alfalfa (*Medicago sativa*).

Cultural Resources

To mitigate the possible loss of any buried cultural property not yet identified and which may qualify for the National Register, the lessee would be required to notify the responsible federal agency if cultural materials are found during his operation. All ground disturbing work must be stopped in the area of the cultural discovery until the operator is told to resume by the responsible federal agency. Arrangements would be made to recover cultural data found after operations begin as outlined in 36 CFR 800.7.

If the responsible federal agency identified any potential impacts to the Cox Fortification Site in reviewing the final mine plan, appropriate mitigation measures should be devised to protect or recover the attributes of the site which qualify it for the National Register. Pending review of the mine plan, the lessee could also be required to complete inventories contiguous to the lease application areas if potential impacts are identified here.

Chapter 5 - Residual Impacts

Chapter 5

RESIDUAL IMPACTS

Residual impacts are those impacts which can be expected to persist after the reclamation phase has been completed. Even if all recommended mitigating and enhancing measures from Chapter 4 are incorporated, some impacts could still result. Environmental components which would not be subject to residual impacts include: Air Quality, Cultural Resources, Recreation, Aesthetics, Socio-Economics, and Land Use. Residual impacts could be expected on the following environmental components.

Topography

The post-mining topography would be permanently altered to a more gentle slope.

Geology

Based on present mining technology. The D_2 seam would be committed to non-use if it is by-passed at this time.

Soils

The existing soil resource would be lost and could not be regained on the ridges, knolls and hillsides where poorly developed Entisols

are found. State laws on slope limitations and strip mining techniques prevent the reconstruction of these soils. Soil depth would be modified on the remaining areas. Soil quality would also be affected on the remaining areas at depths greater than 15 inches in sections 8 and 9 and 21 inches in sections 17 and 20 since good and fair topsoil sources are only available to these depths (See Tables 2-5, 2-6, 2-7,& 2-8).

This quality would range from better to poorer depending on the quality of the original soils in a given area. Nearly 87% of the area would have better quality soils, while 18% would have poor quality soils. Most of the naturally occurring soil characteristics would return within 25 years, although some would take longer.

Hydrology

The Anderson-Dietz 1 coal aquifer in the lease area would be destroyed by mining. The spoil replacement aquifer that would be established after mining is completed, would have a reduced flow rate. this water would be suitable for stock watering but the high total dissolved solids value of over 6,000 milligrams per liter would preclude its use for irrigation or domestic use. The dissolved solids content should improve with time.

Vegetation

A total of 12 acres of the juniper community would be lost indefinately. However, some degree of success with re-establishment has been achieved.

Vegetation diversity may be lost for as many as 3 to 5 years after mining. A more uniform vegetation cover would occur on the application area as a result of changes in soil properties and reclamation requirements. This area would return to native range in accordance with state laws for reclamation.

The mixed grass prairie of the Northern Great Plains can be successfully revegetated under presently known methodology with a high probability of success. 1/, 2/

Animals

Domestic

Domestic livestock grazing would be eliminated for a short-term period of about 3 to 5 years after adequate vegatative cover has been established in the application area. The 22

1/ Defuit, E.J. and Douglas J. Dollhopf, 1978. Revegetation Research on Coal Surface-Mined Lands at West Decker Mine, Decker, Montana: Progress Report 1975, Research Report 133, Montana Agricultural Experiment Station, Montana State University, Bozeman, Montana, p. 24,25.

2/ National Academy of Sciences/National Academy of Engineering. 1974. Rehabilitation Potential of Western Coal Lands, Ballinger Publishing Co., Cambridge, MA p. 82.

AUM's of annual livestock grazing on private surface owned by Decker Coal Company in section 8 and 9 would be lost even if the federal coal is not leased.

Wildlife

The most significant effect of mining would be the loss of mule deer winter habitat in the steep slope areas. This loss of steep slopes could also alter or reduce the hunting territory of the resident golden eagles as the thermal updrafts common to steep terrain could be eliminated by slope reduction. Another possible effect would be an adverse alteration in the antelope migration movement through the area. This impact would last through the mining and reclaimation phase of the application area, 10 to 15 years. Any future mine expansion in this area would prolong this effect. Expansion of the mine area would increase the human-wildlife interaction and negatively affect the wildlife populations of the area.

Chapter 6 - Alternatives to the Proposed Action

Chapter 6 - Alternatives to the Proposed Action

Chapter 6

ALTERNATIVES TO THE PROPOSED ACTION

The definitive action assessed by the Bureau of Land Management (BLM) on a coal lease application is to lease, or not lease. The BLM has the option of selectively denying the lease of certain tracts, or portions thereof, of a lease application for documented reasons such as excessive environmental degradation, maximum economic recovery, or land use planning recommendations. In the assessment of the entire proposed coal lease, the impacts that would warrant selective denial of certain tracts, or portions thereof, will surface in this assessment. In this manner, the environmental consequences of the proposed action, and the public response to these consequences, are forwarded to the Secretary of the Interior. As a part of this environmental assessment, the following alternatives are assessed.

CONTINUATION OF MINING WITHOUT THE PROPOSED LEASE

Description of the Alternative

Continuation of mining without the proposed lease would not prevent continued development at the West Decker Mine or the proposed North Extension.

Environmental Impacts

The environmental impacts of the no-lease alternative would be similar to the proposed action. Without the lease, the mine plan shows the spoil areas, topsoil storage area, highwall reduction, and there mining-associated disturbances will take place on the application area. The area of surface disturbance will amount to approximately the same area as the proposed action. The extent of subsurface disturbance would be reduced by approximately 160 acres. The no-action alternative would not serve to significantly reduce impacts which would occur if the application area was mined.

The no-lease alternative would commit approximately 14.3 million tons of coal in the application area and approximately 11.0 million tons of coal in the existing lease area to nonuse. The 25.3 million tons does not form a logical mining unit by itself, therefore, if it is not recovered in conjunction with ongoing operations it probably would never be recovered.

Socio-Economic Impacts

Decker West would still produce 8 million tons per year, but would do so by mining coal holdings which are currently targeted for later production. The mining pattern that would be used would involve some increase in cost due to shorter dragline passes with more moves, but these increases could be offset by the avoidance of

costs associated with removing the deep overburden over the lease application area. Company officials could not net out these costs to show whether a net increase or decrease in costs would result.

It thus appears that the main loss from the no action alternative would be to the federal and state governments. This would result from the fact that this coal would be lost from production at the far horizon of the mine life. The 14,268,696 million tons of federal coal left in the ground would represent a loss of royalties to the federal government of $16,979,748 and of state severance taxes of $32,002,199. 1/

1/ The severance tax is based on a contract sales price calculated by the state. For September of 1978, this price for Decker Coal was $7.48 while the asking price for the coal at the mine mouth was $9.50 in November of 1978 (Coal Week, Vol. 4, No. 46, Nov. 13, 1978). Using the state severance tax rate of 30% and the federal royalty rate of 12.5% times the respective prices to which those taxes apply, a revenue/ton figure of $2.24 per ton to the state and of $1.19/ton to the federal government results (50% of the federal payment is netted back to the state).

Chapter 7 - Consultation and Coordination

CHAPTER 7

CONSULTATION AND COORDINATION

The following persons and organizations were contacted during the preparation of this assessment.

U.S. Fish and Wildlife Service:	Mike Lockhart, Steve Arnstrup, Dean Biggens, Terry McEneaney and Ray Hoem
U.S. Geological Survey Water Resources Division:	Neal McClymonds and Joe Moreland
State of Montana	
Dept. of Fish and Game:	Robert Martinka, Keith Seaburg and Steve Knapp
Dept. of State Lands:	Craig Howard
Montana Historical Society:	Ken Korte
Montana State University:	Edward DePuit
Peter Kibwitt and Sons Decker Coal Company:	Sam Scott, Dave Jennings, Wes Bermel and Judy Shamley

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CHAPTER 8

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